WATER RESOURCES

THE UNIVERSITY OF MICHIGAN
MAR 8 1960
MAIN READING ROOM

U.S. Congress Senate

HEARING

BEFORE THE

SELECT COMMITTEE ON NATIONAL WATER RESOURCES UNITED STATES SENATE

EIGHTY-SIXTH CONGRESS

FIRST SESSION

PURSUANT TO

S. Res. 48

TOPEKA, KANS., NOVEMBER 18, 1959

PART 9

Printed for the use of the Select Committee on National Water Resources

UNITED STATES
GOVERNMENT PRINTING OFFICE
48186 WASHINGTON : 1960

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WATER RESOURCES

WEDNESDAY, NOVEMBER 18, 1959

U.S. SENATE,
SELECT COMMITTEE ON NATIONAL WATER RESOURCES,
Topeka, Kans.

The select committee met at 9:35 a.m. in the Kansas State Teachers Association Building auditorium, 715 West 10th Street, Topeka, Kans., pursuant to call, Senator Robert S. Kerr (chairman) presiding.

Present: Senators Kerr and Schoeppel.

Also present: Theodore M. Schad, staff director, and Paul McBride, chief clerk.

The CHAIRMAN. We are delighted to be in Topeka, Kans., in one of the great States of our country, in a State that is a very close neighbor to Oklahoma, and with whom we have much in common.

I am happy to be here with your distinguished Senator, Andy Schoeppel, a member of our committee, who had the good fortune to be Governor of Kansas when Oklahoma had the good fortune to have me as its Governor. It was our privilege to work together as Governors.

We went to the Senate together and have worked together there on problems common to the two States.

This committee was created by the Senate, through S. Res. 48, for the purpose of making a study and an analysis of the Nation's growing water requirements and of the availability of water with which to meet those requirements.

Our population is booming. Confidentially, Andy and I are having nothing more to do with that, but the increase is nothing short of phenomenal.

Our population is expected to double within the next 35 or 40 years. Our industrial and agricultural production will double in the next 20 to 25 years. The requirements for water will quadruple in the next 25 years. And the development of that tremendous expansion will occur in the areas where the water is available with which to meet the requirements for growing agricultural production and increased industrial production.

So we are making the study at the grassroots. This is the 12th such hearing that we have held. We will have at least that many more in other States, finding out from the people themselves what their requirements are as of now; what they will be in the next 10 and 20 years; and how they feel their requirements can best be met by the water resources available to them.

It is a privilege, as I said, to be here in Topeka. I came here in 1951, as you remember, Andy, when one of the terrible floods that visited Kansas had struck with such devastation and damage, and I

am happy to know that one of the reservoirs required to harness potential danger has been completed.

You know, Topeka actually has played quite a part in the development of Oklahoma. The great run that took place in northeastern Oklahoma in the latter part of the last century, Governor, was participated in by many people who came up the Missouri River, up the Kaw River to Topeka, and then overland to the southeastern border of Kansas to be ready to make that great run into the promised land of northeastern Oklahoma.

I understand that some of them stayed up here.

We will now have a statement from your distinguished Senator, and then he will present the Kansas witnesses for our hearing.

Senator SCHOEPPEL. Senator Kerr, and Senator Docking—Governor Docking. [Laughter.]

The CHAIRMAN. I will tell you, Andy, you did something for him in about a minute that took you and me many a long year.

STATEMENT OF HON. ANDREW F. SCHOEPPEL, A U.S. SENATOR FROM THE STATE OF KANSAS

Senator SCHOEPPEL. I want to say to you, Bob, that we here in the State are genuinely appreciative of the fact that it was through your guidance and suggestion that a series of these meetings were set up in a number of these States on the ground floor level rather than as a regional meeting, to start with.

I am delighted, of course, to be a member of this committee and to associate myself with the work that this committee is attempting to do.

I want to express at this time our appreciation and my appreciation for all the State agencies that have cooperated in this Kansas hearing, in getting this underway.

Many people wanted to testify, and many, of course, could not be heard orally, as you will note on the agenda here. We are going to follow it as nearly and as closely as we can to give everybody an opportunity to get their statements into the record, as well as the oral presentation that they will be asked to give, or care to give within the limits allotted to them.

This is a working session. We hope you people will avail yourselves of it and the record that is going to be made here as well as in these other States.

Now, it gives me a lot of pleasure to introduce to this group and to you, Bob, and all the rest of the folks here, the chief executive of our State, Governor Docking, and we will be delighted to hear from you, sir.

STATEMENT OF HON. GEORGE DOCKING, GOVERNOR OF THE STATE OF KANSAS

Governor DOCKING. Thank you.

If I may borrow this microphone?

Thank you, Senator Schoeppel.

I wish when you presented me with the title you had given me the salary to go with it.

I am going to give you a short note of welcome and then I have to get back to the store because my executive secretary says people are waiting.

But I am well represented here at the meeting and I am particularly pleased that my good friends, Senator Kerr and Senator Schoeppel, are here.

Of course, they know this territory unusually well. So I think everything will be fine.

I also am well represented. Our water resources board, of course, with very able Bob Smith and his staff, is here and I have my own personal representative here, who I think has not missed a meeting since he has been in office, Bill Sloane.

So you are not missing anything out of the Governor's office and we are on the ball and will be with you all the way.

I would say about Senator Schoeppel, I have known him for a good many years. I knew him first when he was pitching baseball for the University of Kansas, more than 10 years ago, before he became an outstanding football star at the University of Nebraska.

Those were the days when my own school, the university, used to complain some because so many of their athletes seemed to go north.

You know, with the change in the climate we are now getting some complaints from Texas Christian University and the Aggies because some of their athletes are still going north to be landing not in Lincoln, but in Lawrence. In those days of course, our baseball players went to Nebraska and became football players.

The world runs on water. Civilization always followed the rivers. It is one of our natural resources that none of us can do without.

Senator Kerr, I think, has done a fine job and any of you who look at a map of Oklahoma can see that he has done an unusually fine job in developing the water resources of Oklahoma, which is one of our new States.

I cannot help but think that a long time before the runs, my father was working for a short time in Honeywell on the Cherokee strip and that an uncle of mine spent some years as a commissioner with the Indians, within the lifetime of a few of the people here.

So a new State has developed, with its water resources keeping pace with its oil and land and all the other features of Oklahoma. This has built it into a great State and we are building the same way.

I wish to thank Senator Schoeppel for the work he has done, particularly in connection with the Tuttle Creek, which was promoted over a lot of political, but not economic objections. I think it has been the breakthrough and the one thing that has started the development of our water program so that we will be able, with the industry that goes with them, the irrigation that goes with them, and all the other things, to support in comfort a population of two and a half times what we have in Kansas at the present time, and maybe even more, simply by proper use of our water resources.

Those of us who live along the Kaw Valley, or some of the other valleys in 1951 and watched what happened with the flood, will remember.

I started cleaning the house of a friend of mine in North Lawrence. We started with a shovel after the flood. That was just

minor, because I remember a friend of mine in Armordale. I said, "Did you have any water in your home?"

He said, "Yes, 28 feet at my house. It was completely under water." So that is when water gets out of control.

We have two problems:

1. Put it under control; and

2. After we get it under control, to use it for recreation, for irrigation, for industrial, for higher standards of living, and for everything that goes with it.

I do want to thank the Senators, and I know that they are as dynamically interested in promoting these waters all over Kansas and water districts, big dams, little dams, and all the other phases of that, as you are, and that out of these hearings will come the same kind of water development which we have been having in States such as Oklahoma, which has done such a fine job.

It is a pleasure for me to have been here with you, to help get this meeting started, and even have the privilege of filibustering a little to all of you.

It is nice to be here, and I hope you have an unusually successful meeting.

I don't need to welcome Senator Schoeppel: he belongs here.

Senator Kerr, I hope you have a wonderful time here in the State and I also hope that out of this comes something which will be profitable to the entire economy of the United States and especially to Kansas.

Thank you.

The CHAIRMAN. Thank you very much, Governor. [Applause.]

Governor, you were talking about one of your boys going to Nebraska. In turn, I want to say that one of your great boys came to Oklahoma. Out of the outstanding men that graduated from Kansas University Engineering School is my partner, Dean McGee. I think he is probably the greatest Oklahoman that Kansas ever produced.

All right, Senator, if you will call your witness.

Senator SCHOEPPEL. At this time I want to say that I have a letter here from the distinguished Governor of Missouri, James T. Blair, Jr. and this is what he says:

> This is to inform you that Mr. Basey Vanlandingham, who is a member of the House of Representatives of the State of Missouri, will represent me at the water resources meeting at Topeka on November 18.

Is Mr. Vanlandingham here this morning?

I understand he will be here later this afternoon.

Now, Senator Kerr and members of the organizations here who are interested in testifying and getting matters into the record, we have approached this on a basis of segmentizing, which we hope will work out very satisfactorily and we have designated coordinators for each of the groups. It is our hope that the coordinators will present those who are going to testify with reference to that category and we must hope that we can keep within the time limits.

I am happy, of course, at this time, to have my fellow townsman down at Wichita, Paul Ross, who is chairman of the water resources board as coordinator of the general statement outlining the water situation in Kansas.

Senator, here is Mr. Ross.

STATEMENT OF PAUL ROSS, CHAIRMAN, KANSAS WATER RESOURCES BOARD

Mr. Ross. Mr. Chairman and gentlemen, my name is Paul Ross, Wichita, Kans., and I currently serve as chairman of the Kansas Water Resources Board.

The water resources board is an appointed body, made up of seven citizens of the State. The Board is primarily a water resources planning organization. The board members serve without pay and meetings are held quarterly or as often as need may arise to establish programs policies.

The board program is carried out by full-time staff under the supervision of the executive secretary. In carrying out its planning program the board has the assistance of the other associated State agencies.

I would introduce at this time, Mr. Robert L. Smith, executive secretary of the board, who will present a statement on the general water situation in Kansas and some of the problems that require future consideration.

Mr. Smith will be accompanied by Dr. Frank C. Foley, director, State geological survey; Mr. R. V. Smrha, chief engineer, division of water resources, State board of agriculture; and Mr. Metzler, State engineer, division of sanitation, State board of health.

Also, Dr. Glenn H. Beck, director of the Kansas Agricultural Experiment Station.

These gentlemen by State law, are designated as advisers to the board and in the order named represent the State agency having primary responsibility for ground water investigations, administration of State water rights, administration of State laws pertaining to public water supplies, and pollution abatement and agricultural resources related to use and control of water.

I now present Mr. Smith.

STATEMENT OF ROBERT L. SMITH, TOPEKA, KANS., EXECUTIVE SECRETARY, KANSAS WATER RESOURCES BOARD; ACCOMPANIED BY ROBERT V. SMRHA, CHIEF ENGINEER, DIVISION WATER RESOURCES, STATE BOARD OF AGRICULTURE; FRANK C. FOLEY, LAWRENCE, KANS., STATE GEOLOGICAL SURVEY; DWIGHT METZLER, TOPEKA, KANS., CHIEF ENGINEER, DIVISION OF SANITATION, STATE BOARD OF HEALTH; AND GLENN H. BECK, MANHATTAN, KANS., DIRECTOR, KANSAS AGRICULTURAL EXPERIMENT STATION

Mr. SMITH. Mr. Chairman and gentlemen, my name is Robert L. Smith. I serve as executive secretary to the Kansas Water Resources Board.

I have a rather lengthy prepared statement, which was developed in cooperation with the gentlemen who accompany me here today, and which is endorsed by those gentlemen.

I do not plan to read but portions of the statement, but I would request permission to file the entire statement and make the entire statement a part of the record, if I may.

Senator SCHOEPPEL. The entire statement will become a part of the record.

(The statement referred to follows:)

STATEMENT BY ROBERT L. SMITH, EXECUTIVE SECRETARY, KANSAS STATE WATER RESOURCES BOARD

Mr. Chairman and gentlemen, my name is Robert L. Smith. I am employed as executive secretary and chief engineer for the Kansas Water Resources Board, a department of State government with primary responsibility in the field of water resources planning. Accompanying me today are Dr. Frank C. Foley, director, Kansas State Geological Survey; Mr. R. V. Smrha, chief engineer, Division of Water Resources, Kansas State Board of Agriculture; Mr. Dwight Metzler, chief engineer, Division of Sanitation, Kansas State Board of Health; and Dr. Glenn H. Beck, director, Kansas State Agricultural Experiment Station, each of whom is designated by State law as an adviser to the Kansas Water Resources Board. In the order above named, these officials represent the State agency having primary responsibility for ground water investigations, administration of State water rights, administration of State laws pertaining to public water supplies and pollution abatement, and agricultural research related to the use and control of water. They have assisted in the preparation of these remarks and endorse same.

Your committee has been furnished previously a comprehensive summary, together with extensive supporting data, on the present and anticipated future water requirements in Kansas. I shall not repeat such detailed statistics in these remarks. However, the several State agencies stand ready to supply any additional information which might be available to them and which you or your staff may subsequently require in future consideration of your overall assignment. Today, I shall try to describe the nature of the significant hydrologic factors in Kansas and the basic problems they present, to summarize what has and is now being done to resolve those problems, to indicate how and where past, present, and proposed actions may fall short of ultimate needs, and to delineate certain items that appear to deserve your continued consideration.

CHARACTERISTICS OF AVAILABLE WATER SUPPLIES AND PROBLEMS POSED

The net regenerating water supply for Kansas is predominately the precipitation that falls within the State. To this may be added the streamflow into Kansas from adjacent States and the slow movement of water in some groundwater reservoirs that extend across State boundaries. In addition, there is appreciable ground water available in storage in certain areas.

In terms of averages, the water supply available would appear to be ample. However, it is most misleading to rely on these so-called average water figures. Precipitation varies appreciably with geographic location and with time. Streamflow characteristics are even more variable. The occurrence of ground water is influenced by the basic geology and consequently its availability varies widely with geographic location. These several factors add up to a water paradox of sorts which is graphically illustrated by figures 1, 2, and 2a, attached hereto. These figures indicate that the western part of the State is presently endowed with appreciable ground water and little surface water, while the reverse situation exists in the eastern section. A more specific description of these variances in the hydrologic character of this State and how such variance pertains to the several water problems posed is as follows.

Precipitation

The average annual statewide precipitation is 27 inches, and ranges from less than 16 inches in extreme western Kansas to more than 40 inches in the southeastern corner. However, individual station reports have ranged from less than 5 to more than 60 inches.

Dry land agriculture remains the backbone of the Kansas economy and from 85 to 90 percent of the available rainfall is utilized in fulfilling evapo-transpiration requirements. (An appreciable portion of this requirement must be classified as consumptive waste.) Over the long run, the equivalent of 23 to 25 inches of rainfall is consumed in the evapo-transpiration process. Hence, in the western third of the State, average streamflows and average recharge rates are very small, both being measured in fractions of an inch annually. The need for supplemental water for agriculture is very apparent in western Kansas. In years of below average precipitation, the problem obviously extends over more

of the State, and when time distribution of the rainfall is considered, there is a period in almost every year when supplemental water would be advantageous to agriculture everywhere across the State.

The variable precipitation pattern affects every segment of the water-based economy in Kansas. Below normal precipitation has a most adverse effect on agriculture. Studies indicate a remarkable correlation between 2-year moving average precipitation and cash farm receipts—a relationship that allows the generalization that for each inch of statewide deficient moisture, cash farm receipts are off $20 million.

Ground water

The total ground water in storage in Kansas has been estimated to be about 200 million acre-feet. The largest ground-water reservoirs and those capable of the greatest yield to wells are located in the western and south-central portions of the State. In eastern Kansas, large yields from wells can generally be obtained only along the flood plains of the larger rivers and in the extreme southeastern corner of the State. Only along the Kansas River and some of its tributaries and in the southeastern corner of the State do such wells represent a firm supply during drought. Because of these limitations in availability, the use of ground water elsewhere in the State is small and frequently limited to individual domestic supplies. Generally, the quality of the available supply is good, although natural mineralization does limit the availability of ground water in north-central Kansas, and localized areas of pollution do occur elsewhere. A combination of natural pollution and earlier artificial pollution has resulted in water of adverse quality in some of the valleys of south-central Kansas.

Joint consideration of the precipitation and ground-water characteristics discussed thus far explains several of the basic water trends and water problems in the State. To illustrate, previous comments indicated the need for irrigation water, particularly in the western one-half of the State. To meet this need, appreciable irrigation development is taking place. In the southwestern corner, lack of surface water, the relative availability of ground water and also natural gas for fuel, and certain other economic factors have collectively led to extensive irrigation from wells. Most of the organized surface-water irrigation developments involving reservoir storage are located in north-central Kansas. Here, greater rainfall and larger tributary drainage areas do provide sufficient runoff to allow some opportunity for surface storage, but ground water is not readily available.

One major limitation stands out and is of long-range concern. Precipitation is not sufficient to recharge any significant depletion in the ground-water reservoirs in the western part of the State. Hence, although ground water is readily available, concentrated use in the western third of the State will tend to reduce the supply in storage. The long-range picture, therefore, is one of mining and certain basic research needs are easily visualized.

Surface water

The average annual runoff leaving the State approximates 12 million acre-feet (about 10 million when imports are excluded), but this amount has ranged from less than 2 million acre-feet in 1956 to over 42 million acre-feet in 1951. Whereas average annual precipitation increases approximately threefold across the State, runoff has a range of eightyfold from a fraction of an inch in western Kansas to as much as 11 inches in the extreme southeast.

Variability is the normal situation—stability the exception—where natural or unregulated flows are concerned. In the typical stream, 75 to 85 percent of the total supply occurs in approximately 15 percent of the time. Moreover, the so-called average flow will be equaled or exceeded but 15 percent of the time, and for an equal portion of the time, the stream will be dry. Only the Kansas, Big Blue, and Republican Rivers in the Missouri Basin portion of the State and the Arkansas River plus two or three of its tributaries can be considered truly perennial streams. Only the Big Blue and Kansas Rivers have any appreciable flow during very severe drought.

Perhaps the outstanding example of the variability that can be experienced occurred on the Neosho River within the present decade. Here, a drainage area of approximately 4,000 square miles produced a peak flood discharge in the magnitude of 400,000 cubic feet per second in 1951. Five years later a city of approximately 10,000 people located on the same stream had to recirculate sewage effluent through the local waterplant in order to fulfill common domestic and municipal water needs. The case cited is admittedly extreme, but the same

general problem is typical of unregulated surface-water supplies in much of Kansas.

These extreme variations in the natural distribution of the surface-water supply is the case of many of the major water problems in Kansas. When coupled with previously cited information on the occurrence and distribution of precipitation and ground water, the problems take on even more significance.

A severe flood threat is ever present throughout the midcontinent area, and certainly this is true in Kansas. The nature of the flood-producing storms in this part of the Nation is such that practically all parts of the State have either experienced severe flood damage or present potential flood targets. This is true of main stem and tributary alike. It is even true of the western valleys where long-term average conditions indicate little significant runoff, but where at least one short intense flood-producing storm seems to strike each year. Flood damage intensifies from west to east across the State, because of the more frequent occurrence of flood-producing storms and because lack of ground water, relatively rugged terrain, and thin soils forced early settlement in the valleys as a means of obtaining necessary water, easier grades for transportation routes, and land for cultivation. Overall, average annual losses from flood in Kansas have been estimated to exceed $5 million. The need for, and interest in, flood control of one kind or another is intense throughout the State.

Kansas also experiences severe water famine. This is true even where average runoff is relatively high. Droughts in Kansas continue for several years, evaporation rates are high, and in those areas where there is insufficient ground water, the failure to store enough of the periodic excess for use in periods of water deficiency can be disastrous. Hence, water supply for all purposes is a major problem in much of the State and must be acknowledged as a growing problem. A few observations on past experience will serve to illustrate.

The rural domestic and livestock water user is one of the hardest hit in times of severe drought. Rather detailed surveys in both 1954 and 1956 indicated that water hauling costs to the ranches and farms of this State exceeded $10 million each year. The need for more adequate storage facilities is readily recognized. However, in many cases, the problem reduces to one of insufficient initial credit, and until this financial hurdle is resolved, storage no matter how well justified does not become reality. Likewise, many municipal impoundments have proven inadequate and here, too, the task is formidable. Here in eastern Kansas, it has been determined that to satisfy a demand equal to 30 percent of the average runoff of a catchment area would require initial storage of 5 to 8 times the annual demand to meet water needs without restrictions during a drought such as occurred in this decade. Overall it has been estimated that average annual out-of-pocket losses from water deficiency, including the hauling costs and cash farm receipt items cited earlier, approach $75 million. To what extent the two-edged sword of flood and deficiency in surface-water supplies has inhibited growth of the Kansas economy, no one can estimate.

As in the case of ground water, the quality of the available surface-water supplies in Kansas is good. There are exceptions. In the Missouri Basin portion of the State, the Smoky Hill and one of its principal tributaries, the Saline River, are high in chlorides and total solids and are definitely a grade below the quality of other Kansas Basin tributaries. These waters are usable, however, for many purposes. The main stem of the Arkansas River has long been plagued with excessive sulphates throughout its course in Kansas. Below Great Bend, it also carries a high chloride load, some of natural origin and some resulting from prior activities of man. Chlorides also plague several of the south-central tributaries to the Arkansas, and the quality of the ground water in the alluvium of the main river and also in some of the tributaries is not good.

The need for adequate pollution abatement is most obvious in Kansas. In western Kansas where the only major source of supply is ground water, no locality can afford to have the water polluted. In eastern Kansas where little ground water is available and surface supplies must be relied on for reuse either instate or outstate, necessity demands that the water be maintained in adequate quality. Hence, the abatement of pollution is a must and the State maintains a vigorous abatement program. During the past decade, appreciable progress has been made in eliminating existing sources of pollution in every area of the State. Kansas communities, including those on the Missouri River, are proceeding with the design and construction of adequate treatment facilities. There are some long-range water management gains at stake in the pollution abatement program. To illustrate, the adverse quality now experienced in some

of the south-central streams tends to increase the pressure on the available ground-water resource. On the other hand, there is opportunity for appreciable sustaining natural recharge in that area. As the stream quality is improved, development of surface-water storage and/or intermittent use of unregulated surface flows when they are available could aid the recharge process appreciably by lightening the pumping load on the ground-water sources. Eventual dual operation and management of the ground and surface supplies in portions of south-central Kansas appears mandatory.

In much of Kansas, water quality requirements may well prove the limiting factor in growth of industrial economy. In western Kansas, the lack of streamflow presents problems of waste disposal. Similarly, in eastern Kansas where heavy reliance must be placed on surface supplies, and where subsequent reuse either instate or outstate of those supplies is necessary, industrial growth may be limited if adequate sustaining flows are not developed. This is not to argue for streamflow in lieu of waste treatment. Instead, it is simply to acknowledge that in handling the treated wastes of civilization and also those inorganic wastes which are not amenable to treatment, certain minimum flows must be maintained. Significantly, State water studies now underway indicate that maintenance of minimum flows may well be the controlling water supply factor if significant industrial growth is to take place in Kansas. These same studies indicate that limitations in the availability of storage sites make the possibility of developing firm yields on the major streams in excess of 5 percent of average yields most limited, except along the main stem of the Kansas River. Deviations from the above will depend ultimately on the relative stress placed on the allocation of reservoir storage to competing functions such as flood control.

Before leaving the general subject of surface water, it must be noted that natural lakes are practically nonexistent in Kansas. This, coupled with the fact that there are few perennial streams in the State, means that, in the absence of streamflow regulation, the opportunities for water-related recreation presented the 2 million Kansas residents are most limited.

Soil management considerations

The variable hydrologic patterns discussed above present obvious problems of soil management. In western Kansas, the lack of moisture, coupled with the typical air movement over the plains, presents serious wind erosion problems. Land treatment necessary to minimize the problem and to maximize the availability of soil moisture for dry land agriculture is well recognized. In eastern Kansas, a more rugged terrain, thin soil zones, and higher rainfall shifts the emphasis to water erosion and places more stress on maximum use of valley lands for cultivation. Again conservation practices directed at minimizing erosion and maximizing soil moisture are required.

Summary

In summary, the natural distribution of water supplies poses the following major problems:

(*a*) The need for supplemental moisture for agriculture, a problem which intensifies from east to west.

(*b*) The need for adequate ground-water management, a problem of long-range concern because the most extensive, thickest, and most productive ground-water aquifers are located where opportunity for recharge is least.

(*c*) The need for flood control, a problem which intensifies from west to east.

(*d*) The need for carryover storage to satisfy rural domestic, livestock, irrigation, and municipal water supply needs.

(*e*) The need statewide for land treatment to increase soil moisture and to reduce wind and water erosion.

(*f*) The need for more sustained streamflow in the major stream if significant industrial growth is to be attained.

(*g*) The need to increase water-related recreational opportunities.

(*h*) The need to maintain a vigorous program of pollution abatement.

EFFORTS TO DATE

The problems enumerated have long been of concern to individuals and to all levels of government. Accordingly, much effort has been exerted to resolve these many problems. It is not appropriate to try to itemize the many past and present activities at this time. However, the following paragraphs summarize the existing status of many of these efforts.

Local efforts

In the years following the beginning of settlement in Kansas, local government or private individuals had almost sole responsibility for trying to overcome the water problems encountered. Their efforts are exemplified by the operations of the many levee districts, drainage districts, municipal and industrial water supply, flood control, and pollution abatement developments, soil conservation districts, watershed districts, irrigation districts, and rural water supply districts. The total combined efforts of these many local activities when measured in terms of present dollars is tremendous. No one can say what the total might be but certainly it has been many millions of dollars and these activities continue today.

State activities

There was previously furnished this committee a comprehensive statement on activities of State government in water resources development and so only summary comments are contained herein. That statement pointed out that State government activities in the water resources field started with the enactment of some of the earliest State legislation and have gradually expanded, particularly from 1917 to date; that historically, primary emphasis has been on basic data collection and the enactment and administration of various enabling or regulatory laws necessary to the successful resolution of the water problems presented. Also, that prior to 1958, the State constitution prohibited State government from participating financially in works of internal improvement which included flood control and water resources development.

Briefly, State government is engaged presently in the following programs:

(*a*) A comprehensive State water planning program directed at determining present and future water needs, potential availability of water to meet these needs, the coordination of local, State, and Federal activities, and resolution of interstate problems.

(*b*) Comprehensive water administration, including a vigorous pollution abatement program and the administration and enforcement of water rights legislation.

(*c*) Administrative assistance to the 105 soil conservation districts that blanket the State, and organizational guidance and assistance to local watershed districts.

(*d*) Development of State lakes, fish and wildlife refuges, and State parks.

(*e*) The collection, analysis, and interpretation of basic data on ground water; streamflow; suspended sediment; chemical, bacteriological, and radiological quality; topographic mapping; and soil surveys; much of which is undertaken in cooperation with appropriate Federal agencies.

(*f*) Basic research on irrigation methods, development of farm water supplies, soil-water relationships, economics of water use, and other specialized water-related items.

Progress is being made in all these areas of activity. There is room for improvement and need of expansion in the scope of some of these endeavors. For example, the rapid increase in ground-water use poses a definite need for acceleration of the ground-water investigations. Completion of initial State plan studies in 1961 will provide an opportunity to give detailed consideration to future programing of State activities.

Federal activities

In the past two decades, the several Federal development programs have made a vital contribution to the resolution of Kansas water problems. Reference is made here to the activities of the U.S. Corps of Engineers, the U.S. Bureau of Reclamation, and the U.S. Department of Agriculture. Progress in the actual implementation of these programs, a large portion of which presently remain in a pending status, appears to be a most vital factor in the water future of Kansas. It is understood that the several Federal agencies are providing the committee with specific details relative to the individual projects and no attempt will be made herein to duplicate that detail. The following summary comments do, however, relate those programs to the problems discussed above and appear to be appropriate.

Corps of Engineers.—Reference to figure 3 attached herewith will show the location, type, and general status of the Corps of Engineers projects either completed or under construction, authorized for construction, or undergoing current investigation. The approximate estimated cost for structures now authorized, constructed, or under construction is $629,357,000. Attention is invited to the fact that the majority of these projects are located in the eastern portion

of the State. This is in response to the general flood control problems cited earlier and all these projects have flood control as a primary function in keeping with the congressional directives under which the Corps operates. The primary objective of these projects is to reduce the flood damages and the flood threat that exists on the main stem streams.

Bureau of Reclamation.—Reference to figure 4[1] attached herewith will show the location and general status of the Bureau of Reclamation projects in Kansas. The approximate estimated cost of projects now constructed, authorized, or specifically recommended is $184,986,000. In this instance, it will be noted that the projects are located primarily in central and western Kansas. This location results from the primary objectives of the reclamation law as it is applicable to Kansas in that these projects have as a primary function the development of water for irrigation and/or municipal water supply. The concentration in central Kansas reflects the unavailability of surface supplies farther west, and the advance status of those projects located in northern Kansas reflects the relative availability of alternate ground-water supplies in north-central and south-central Kansas. The bulk of the irrigation in Kansas is now and will continue to be from individual well or surface water intakes owing to a number of factors which limit the opportunity for organized ditch and reservoir operations. In the West, ditch operations are limited generally by available surface supplies, and hence reliance is placed on well supplies. The majority exception thereto are the long-established ditches in the Arkansas River Valley from the Colorado line to Garden City. Undoubtedly, there will be an appreciable increase in irrigation in the future, even in the eastern third of the State. However, water needs here are of a more supplemental nature and it appears doubtful that organized ditches will supplant individual well and surface water intakes.

U.S. Department of Agriculture.—The programs of the U.S. Department of Agriculture are becoming of increasing significance. It was noted earlier that the basic soil conservation program is accepted across the entire State with each of the 105 counties in Kansas having an organized soil conservation district. These district activities are supplemented by the agricultural conservation program and other activities of the Department. In at least half of the area of the State, a completed land treatment program is probably the only practical approach to individual farm water and erosion control problems. It is not surprising therefore that these going programs find wide support or that each year demands for technical and financial assistance far exceed the total resources available. Passage of the Hope-Aiken Watershed Act has set the stage for appreciable expansion in U.S. Department of Agriculture contributions to water control and development in Kansas. Reference to figure 5, attached herewith, indicates the areas where local watershed districts have been organized under State law. All of these districts have either requested Federal planning assistance or are making arrangements to do so. The watershed program differs from other U.S. Department of Agriculture activities in that it allows more emphasis on those structural phases which cannot be handled under the regular SCS or ACP programs. At the request of the water resources board, the Soil Conservation Service made a study of the potential applicability of the structural program throughout the Kansas Basin. Using that study as a guide, the water resources board has estimated that the structural program may be applicable to 40 percent of the area of the State, and $500 million is probably a reasonable estimate of the structural costs for such ultimate development. Again it should be noted, as in the case of the Corps of Engineers and Bureau of Reclamation programs, that hydrologic factors influence the location of interest. The concentration of watershed activity in the eastern half of the State is again in response to the erratic flood and famine nature of the available surface-water resource.

Summary

The potential overall Federal development needs in Kansas, as measured by application of currently authorized activities, are appreciable. How effective such programs will be in meeting needs will depend on the "ifs" and "whens" installation is completed. There can be no question but what the installation of these several Federal programs would bring to many Kansas valleys and communities a stability not heretofore possible in the form of reduced flood threat, and in some instances improved local water supply. Just as assuredly,

[1] Retained in committee files.

these programs would provide a number of secondary benefits, not the least of which would be an appreciable increase in opportunity for water-related recreation.

MATTERS FOR CONTINUED CONSIDERATION

All water problems cannot be resolved nor can all future problems be anticipated. There are several areas, however, where present activities will not fill the bill, and these gaps should be recognized by all levels of government. Moreover, this recognition should be formally reflected in future administrative or legislative policy, whichever is appropriate.

Preservation of water quality

The day is coming when fresh water will bring premium prices and present pollution abatement programs directed at protecting our fresh water are only the initial step. Improved methods of handling inorganic wastes are necessary to minimize streamflow dilution requirements for a growing society. Obviously, the question of waste disposal of radioactive materials will be of increasing concern. It is understood that the committee is seeking special reports on these subjects and certainly such action is timely.

Soil-water-plant relations

Neither Kansas nor the Nation can afford to disregard the dominant percentage of the water budget that is devoted to satisfying evapo-transpiration requirements. Any measurable progress in reducing this requirement could have far-reaching effects on the overall water supply picture. The problem presented is one of basic research in soil-plant-water relationships, and possibly one of expensive research. The potential benefits and the relative need, however, are such as to justify extensive exploration. Undoubtedly, the need for such activity stands out in a State like Kansas where agricultural moisture can be so critical and where the available water supply for other purposes, both now and in the future, appears to be limited. Moreover, long-range depletion of the groundwater source now being used to supplement agricultural deficiences gives added cause for concern in Kansas and throughout the High Plains area. Evapotranspiration is the big water user nationwide, and this fact cannot be overlooked in any long-range policies governing water utilization. A comprehensive research program directed at reducing the overall evapotranspiration requirement should be initiated.

Rural domestic and livestock supplies

At the present time, none of the Federal assistanee or development programs appear to be meeting the need for rural domestic and livestock water to the degree that is desirable. This is true even though the State provides additional assistance in the form of a tax reduction benefit for those individuals constructing adequate storage facilities. The problem is intense in Kansas as witness the water-hauling costs cited earlier. Several factors are involved among which are the lack of ground water supplies, poor reservoir sites at points of need, high evaporation losses, and the inability to obtain adequate financial credit. There are several steps which apparently could be taken which might be of assistance. First, present experiments on the use of monomolecular films to reduce pond evaporation should be concentrated on the farm pond type structure where the wind problem is at a minimum and where the evaporation demand represents such a significant portion of the total water demand placed on the pond. Second, the agricultural conservation program policy should recognize so-called headquarter ponds (impoundments at or near ranch or farm headquarters) as eligible for conservation assistance, a recognition it does not grant at the present time.

Future water supplies

Historically, there has been one basic shortcoming in Federal development programs—failure to utilize to the maximum the potential of all reservoir sites largely by failure to develop water supply storage unless there is an immediate and identifiable need. There is a definite need to incorporate long-range water supply considerations in all Government development policies. Reservoir sites constitute rare, important, and nonrenewable resources, and how they are developed and utilized will in the long run determine the ultimate adequacy of the surface water resource. A brief discussion of the situation here in Kansas will serve to illustrate the point.

In earlier discussion on proposed major reservoir developments in Kansas, it was noted that the projects in central Kansas had as primary objectives the

development of irrigation and municipal water supplies. By contrast, those in the eastern portion of the State were indicated to have as primary objectives the development of flood control and no reference was made to water supply. The difference in project planning represents primarily the difference that existed until just recently in national reclamation and flood control legislation.

The matter becomes of concern in considering the possibilities for future economic growth in Kansas. Water for agriculture and flood control for rural and urban dweller alike will bring a stability to present enterprise not previously available, but at the same time it will also present an opportunity for economic growth is going to require water and the opportunities for increasing the firm and is going to have to be based on industry of one type or another. Industrial growth is going to require water and the opportunities for increasing the firm water supply are limited.

Against this background, the Federal Water Supply Act of 1958 providing authority to include provisions for future municipal and industrial water supply in Federal reservoir projects was a welcome step. In the opinion of the Kansas Water Resources Board, it was an appropriate step for present State planning studies indicate the desirability of providing such water supply. Accordingly, the water resources board and the Federal agencies have been giving considerable study to the possible application of that act to the various projects in Kansas. On the basis of considerations to date, several observations appear appropriate.

The practical application of the objectives inherent in the 1958 act will depend on future congressional guidance and executive administration thereof. If, for example, the administrative implementation does not reflect a relatively liberal interpretation of the non-Federal assurance requirement, positive accomplishments may be meager. This is true because State and local interests must resolve the basic financial and legal questions posed and in many instances this will take appreciable time. Such questions always require time and patience and in the present case will be more difficult of resolution, because the issue involved is future supply rather than immediate need. In the meantime, other pressing functions to be served by the projects dictate desirability of early development.

It should be clearly understood that no quarrel is offered with the basic Federal position that the governmental unit or individual who eventually uses the water should repay the storage cost. This is no more than an extension of present policies and is compatible with Kansas water law. It is to argue, however, that neither Kansas nor the Nation is rich enough waterwise to commit reservoir sites to development without making provision for future water supply. A reasonable presentation as to the ultimate need for such water and a showing that development costs are favorable in comparison with other alternatives for future supplies should be enough to justify Federal actions which will help preserve the resource for future use. Finally, it would appear that ultimate repayment in such cases is fairly well guaranteed. Non-Federal interests would have little doubt as to their ultimate repayment responsibility and certainly they would have few illusions as to who could retain operational control of the available storage until repayment was forthcoming.

Before leaving this subject, reference should be made to the fact that the Water Supply Act of 1958 does not apply presently to U. S. Department of Agriculture programs. This appears to be inconsistent with the basic concept of the watershed legislation which allows up to 5,000 acre-feet for flood control and 20,000 acre-feet allocation for water supply in any single structure. There are many communities below 5,000 population that might avail themselves of the opportunity for future storage in connection with this program, but cannot incur such costs now. Obviously, the watershed district cannot be expected to develop such storage for the use of others. At the same time, watershed activities should not be allowed to usurp sites which could be used for future water supply. Extension of the principles embodied in the 1958 Water Supply Act to the watershed program would appear to be desirable.

Basic data needs

Programs for the measurement, analysis, and publication of basic hydrologic data, topographic and soil mapping will have to be accelerated. Refinement of present knowledge will have to be provided in response to growing water needs. In addition, there is a tremendous need for the development of economic base data on the relative value of water for various purposes as a guide to water planning and water administration. Data programs must be maintained in a

vigorous and up-to-date manner, otherwise future development cannot hope to have an adequate factual foundation.

Improved coordination

Coordination of water resources development is a must if significant progress is to be made. Much has been said and written about the subject and there are admitted problems in the several areas of intergovernmental, interstate, interagency, and interuser relations. It is to be hoped that the work of the Senate select committee will lead to constructive congressional action relative to several of these matters.

One fact is most clear. Until there is a firm establishment of Federal policy, it is improbable that 50 separate States and their many local entities, will uniformly arrive at programs equally compatible with Federal operations. Congressional legislation which would clarify Federal and non-Federal responsibilities and prerogatives in the various phases of water resources development would be most helpful. Coupled with this, of course, is the problem of delineating agency responsibilities and establishing consistent and uniform policies relating to project development. Such legislation by itself, however, is not enough. It must be accompanied by some congressional expression of the degree to which the Federal Government would then expect to meet its pronounced responsibilities. This latter point is necessary if other units of Government, State and local, are to have any true perspective in determining to what extent they can expect to count on Federal action. Until non-Federal interests can make such an evaluation, it is almost impossible for them to establish any long-range programing of their activities. Any of the major development programs may be cited as a case in point. For example, it was noted earlier in these remarks that the ultimate potential for the structural phase of the watershed program in this one State could approach an investment cost of $500 million. When this is compared with the current annual national appropriation of $25 million, the problem is easily discerned.

Intergovernmental and interagency coordination matters would be further clarified if there were some way of maintaining a rather detailed prospectus of Federal intentions for the short-range future. Congressional guidance would be most helpful. It would be of extreme help if at the time Congress considers annual appropriation requests, it could also give a tentative indication of program schedules for as much as 10 years in the future. Various other Federal agencies and State and local groups could use such a schedule as a guide in planning and budgeting their own activities as they are affected by the various Federal projects. For example, local units who are planning to participate in the cost of certain project features would then be in a position to develop their financial program on a relatively firm basis, and other government programs such as highway development would have better opportunity to determine how they should go about meeting their responsibilities in terms of anticipated relocation problems and/or modernization of existing facilities.

Kansas, being an inland State, is vitally interested in and affected by regional-type developments. The construction and operation of the Missouri Basin development program is of concern not only as it relates to those projects located within Kansas, but also as it relates to the construction and operation of those projects which materially affect water control and water use on the main stem of the Missouri River. Similarly, Kansas has fundamental interest in the development programs of the Arkansas River Basin. For some time there has been a growing recognition nationwide that the planning and development of water resources projects must be weighed in light of basinwide and even regionwide needs. Undoubtedly, this is an area where coordination is extremely vital and where it has to continue to operate in the years ahead. There have been a number of proposals submitted to Congress on this subject from time to time. A number of these proposals would establish river basin commissions to coordinate water resources development activities. The need for both ample regional coordination and maintenance of interstate harmony must be recognized if maximum utilization of available resources is to be attained. Historically, Kansas has turned to interstate compacts for resolution of interstate conflicts in water use. Admittedly, compacts do not accomplish regional planning; instead, they provide a framework within which regional development can take place. It appears doubtful that legislation establishing a formal mechanism for regional coordination would necessarily provide interstate har-

mony unless it (1) recognized the authority of interstate compacts, and (2) provided for adequate voting representation by the States involved.

In recent years, substantial concern has developed throughout the Nation over the relative status of State water rights. This concern has developed in response to several recent judicial decisions and the apparent administrative interpretation which has been or might be placed on these decisions. This subject could cause serious problems in the field of intergovernmental relations and if not firmly clarified could well impede the progress of water resources development. The heart of the concern, of course, involves the fear that Federal operations will not recognize the status of those rights vested and acquired under State water law. The matter can and should be resolved by Congress in legislation which would spell out Federal recognition of the rights of the States to administer the use of water within their boundaries, and which makes it clear that there will be no Federal usurpation of those rights established under State water law without proper compensation therefor.

In conclusion, I wish to express the appreciation of the Kansas Water Resources Board, the division of water resources, State board of agriculture; the division of sanitation, State board of health, the State geological survey; and the Kansas Agricultural Experiment Station, for this opportunity to present to you a résumé of some of the major water considerations in this State. I trust that the above remarks have given you some insight into the nature, extent, and scope of Kansas water problems and that they will be of assistance to you as you listen to subsequent testimony today, and as you continue to deliberate the far-reaching and important responsibilities which the Senate has delegated to you.

Mr. SMITH. Thank you, sir.

I would also advise that there has previously been furnished to your committee a comprehensive summary, together with extensive supporting data, relative to present and anticipated water development in Kansas.

I do not intend to repeat the detailed statistics today. I will try to point out the significant hydraulic factors in the State, the problems they present, and also to delineate for you what, at least in the opinion of the group at this table, are matters which deserve your continued consideration.

In that information that was previously submitted to the committee, reference was made to the very unequal graphic distribution of both our ground water resources and surface water supplies in Kansas.

The two charts to my left will illustrate this.[1]

With your permission, I will leave this mike and talk from the chart for a few minutes.

The CHAIRMAN. What is the total runoff of water leaving Kansas?

Mr. SMITH. The total runoff that we export is about 12 million acre-feet a year, Senator Kerr. Actually, we sneak in about 2 million acre-feet, a little bit from Colorado and a little from Nebraska. So we generate about 10 of the 12 million.

The CHAIRMAN. That runs off and leaves the State?

Mr. SMITH. That runs off.

The CHAIRMAN. What is the name of that upper river?

Mr. SMITH. The stream pattern that you see on this second chart, Mr. Chairman, the main river here, is the Kansas River, with tributaries, the Blue, Republican, Solomon, Saline, and Smoky Hill.

This, of course, is the main stream of what we call the Arkansas, here is the Verdigris, and the Neosho, which you call the Grand in Oklahoma.

The CHAIRMAN. Yes; and below?

[1] Charts not supplied for printing.

Mr. SMITH. Below the Kansas is a stream we call the Marais des Cygnes. That crosses the Missouri line and becomes the Osage.

Both of these charts have rather faint red lines, essentially vertical lines, that represent the 20-inch, 30-inch, and 40-inch rainfall belt in the State.

Our average State precipitation is about 27 inches, and about 85 to 90 percent of that is consumed in evapotranspiration requirements. This means that that is essentially 23 to 25 inches.

Also it means, then, in the western portion of the State, this being a 20-inch rainfall line here, we have very little water available for stream runoff or ground water recharge.

This first chart you will recognize as the geologic map of the State.

I might say this rather irregular east-west and wavy shaded line across here happens to divide between the Missouri Basin draining and Arkansas River draining.

The other smaller black lines correspond to the geographic boundaries, to the State water plan study, and are of only consequence today as they will establish a common point of reference as we look at two or three more charts.

I am going to generalize materially in this next statement, but for our purposes today let us say that the bulk of the significant ground water supplies in the State are located where this map shows 10 or the yellow color. This means, then, that in the eastern part of the State the only significant ground water we have is generally in the valley alluvial, and we will go farther and say of the various river supplies probably only the ground water along the Kansas River and possible the Blue and Republican is truly a firm supply in extended drought periods.

There are some exceptions. We have deeper ground water in the southeast corner, but the general picture is ground water in the western part of the State and very little in the east.

The second chart, of course, shows the surface water supply. In this case, we have tried to illustrate graphically the magnitude of that supply and its distribution throughout the State.

The width of the blue band here is a scaled measure of the average annual flow of each of the streams shown.

The surface supply, of course, is erratic. You will see in all of these stream patterns, as far back as it was possible to draw to scale, a narrow red line and whereas the blue shows the average annual export of each of these streams, that is possible 1 in 20 chances it will have no more water than is shown by the width of the red line.

The typical situation of the Kansas stream is this: About 80 percent of the total supply actually became available in about 15 percent of the time and for an equal percent of the time the streams are liable to be dry.

We have very few perennial streams.

The Kaw, the Blue, and Republican are the best perennial streams in the Missouri drainage.

Down here in the Arkansas drainage, we have the main stream of the Arkansas, which has perennial characteristics due to two or three of its tributaries.

Actually, again in severe drought the only stream that has significant flow is the Blue-Kansas system.

The CHAIRMAN. Let me ask you a question.

Mr. SMITH. Yes, sir.

The CHAIRMAN. That upper—what do you call that river just below the Kansas River, the Osage in Missouri?

Mr. SMITH. The Marais Des Cygnes.

The CHAIRMAN. The Marais Des Cygnes?

Mr. SMITH. The marsh of the swan.

The CHAIRMAN. Is it part of the Arkansas River, or Missouri River?

Mr. SMITH. No, this goes to Missouri. The Missouri-Arkansas line shows like this. This goes into the Osage and back in the Missouri River in the vicinity of Jeff City, I hope.

The CHAIRMAN. You said about 12 million acre-feet leave the State a year?

Mr. SMITH. Right.

The CHAIRMAN. What part of that is tributary to Arkansas, and what part tributary to Missouri?

Mr. SMITH. Let us generalize and say about 50–50.

The CHAIRMAN. Fifty-fifty?

Mr. SMITH. Yes.

You may see from this map we are catching almost all the Missouri in one hump and the rest will add up.

The width of the band is added arithmetically.

The quality of water in Kansas is generally good, both ground and surfacewise.

We have an area in north central Kansas here where we have some mineralized ground water. We have some poor quality ground water in the south central part of the State.

Of course, we do have some local areas of pollution scattered throughout the State.

The quality of the surface water is generally good.

Again as to mineralization in north central Kansas, we have a little higher chloride and the total solid content here in the Saline and Smoky Hill is higher than we like.

We have sulfates that come from the Kaw, to the main stem of the Arkansas.

Throughout this point, the Big Ark begins to pick up a chloride. This is due to both natural sources of pollution and also some earlier mistakes of man.

Some of the tributaries in this area also have a little higher chloride than we like.

The good quality surface water there has deteriorated, I think, also some of the ground water in some of the supplies.

Anyway, we call it the water paradox of Kansas with the ground water in the west and surface water in the east.

One last statistic that may be of the same interest to you:

Obviously, to support a sizable population we have problems of waste disposal, and I think it is more understandable from the water picture to recognize that about 75 percent of the State's population, maybe 80 percent of it, actually resides east of the 29- to 30-inch rainfall line.

This natural distribution of the water supplies in the State poses some very obvious problems. The first would be, of course, that we need supplemental moisture for agriculture and this is a problem that intensifies from east to west.

Where we need it the most is in the west.

When we get out to the west the one possibility we have of getting that for agriculture is from ground water supply.

This leads us to some other considerations because whereas we have a tremendous amount of ground water in the western part of the State, now we have no advisable means at the moment anyway of expecting an appreciable natural or artificial recharge of those supplies.

Secondly, the major category——

The CHAIRMAN. What is the source of the recharge?

Mr. SMITH. As far as we know it is precipitation and there just is not enough precipitation out there to satisfy the evapotranspiration requirement.

Our runoff, for example, here, and our recharge, we are currently estimating as a very small fraction of an inch per year.

I think you all are very familiar with another major problem in the State, that is, the problem of floods. This one intensifies from west to east, of course. It is a tough problem on main stream and tributary alike, throughout the State.

Alhough we do not like to cite this, I think it is worthy of note. This is an outstanding hydraulic example that I know your staff is interested in.

We have the Neosho, and you call it the Grand in Oklahoma. That had in 1951 a draining area of 4,000 square miles and so-called average flow of 1,600 cubic feet per second. We have a flood discharge of over 400,000 cubic feet per second.

The potential production of this terrain in eastern Kansas is a tough thing to cope with. It is hard to handle. The interest in the need for flood control is pretty intense throughout the State of Kansas.

The next major category of water problem that you run into, of course, is the need for water storage, and we need water storage for water supply purposes for just a number of situations.

The first one you might itemize is rural livestock demand or domestic supplies.

You may be interested to know in the 2 drought years of both 1954 and 1956, as close as we can determine, we can say that Kansans spent more than $10 million each year hauling water to farms and ranches of the State.

Obviously, we have similar problems of municipal supply.

I cited the Neosho situation for this reason.

Even so-called major streams because of the erratic nature of the supply, have difficulty furnishing even domestic municipal supplies in some of our extended and severe droughts.

The Neosho situation, where I said the average flow was 1,600 cubic feet per second at a point about midway up the main stream here, that same stream 5 years later was not able to supply normal municipal needs.

In fact, we had a town, population about 10,000, which actually recirculated the effluent from its own sewage-treatment plant back through its own water plant for a period of several months in order to fulfill some of their own local water supply needs.

There are other needs for water storage, of course.

Irrigation is one where the opportunity presents itself, and we will discuss that a little more in just another minute.

Then I would like to make the very definite point that it seems to us that we need storage for what I will call industrial water supply, and I am going to tie to it the need for maintenance of streamflow.

The industrial growth in the State, as we see it, is going to be very severely limited by our inability to maintain a sustained flow in these various streams. This is a subject that we have probably given as much concern and study in the last 2 years as any State in the Nation. We probably have as good an appraisal of sustained flow as any State in the Nation.

The result of those studies does not make us too happy because the potential for storage is limited, and we found that with the exception of the main stem of the Kaw River, the possibility of being able to guarantee firm regulated yields during any kind of droughts, we sometimes have from regulated yields in excess of 5 percent of average flow, may be pretty tough.

Eventually deviations from that estimate will probably hinge on how much of our storage we commit to various types of functions, whether we commit it to temporary storage or long-term carryover storage.

We have some competing needs for the available storage.

One last thing on storage: I mention the fact that very few of our streams have perennial characteristics. Natural lakes in Kansas are practically nonexistent. It is quite obvious that storage is part of the answer to meeting the water recreation demand that is already here, and we are not able to cope with it at the present time.

Before returning to the prepared statement, I would also say in the earlier portion presented to the committee, there was a comprehensive summary to state water activities as they exist now. And in fact, historically, the development of the State water activities.

That statement very briefly said that emphasis throughout has been on basin data collection and research and water administration, water resources planning.

It pointed out that until a year ago the State of Kansas was actually prohibited by language in the State constitution from even considering financial participation developed with internal improvements for flood control or water resources projects.

Briefly, at the present time, we do have State water resources planning programs, State water administration programs, and basic data programs and research programs.

And then we have allied programs in the general areas conservation, that is State park development, soil conservation, fish and wildlife development.

I do think that it might be appropriate to look for a moment at the relative location of the various Federal development programs and how they relate to these problems, because in the past two decades the Federal development activities have certainly begun to make a vital contribution to Kansas water problems, and there is no question but what this is going to be a dominant factor in the years ahead.

We also understand that the several Federal agencies are providing you detailed data on the several projects, and we are not going to repeat that here.

We thought a quick look at the three maps might be of interest.

On the first map is shown the Corps of Engineers program in the State of Kansas.

The circles are local protection work, the irregular figures, reservoir projects.

Shown in black are projects completed or under construction.

Those shown in purple or lavender are projects authorized and those shown in the rather bright blue are projects for which some sort of initial planning investigation has either been made or might be underway at the present time.

I might say that the estimated cost of all the projects completed under construction or authorized to date would be something in the magnitude of $630 million.

But the thing we are particularly interested in, I think, from this morning's discussion, is to note the general location of the corps program.

This is, of course, in keeping with the congressional directive. The primary objective of each and every one of those projects is flood control.

Many of them are almost isolated to flood control objective.

Of course, that is true of the local region.

On the next sheet you see the general location of projects under the Bureau of Reclamation program in Kansas. These projects by contrast to the corps reservoirs, of course, have a primary objective of development of water supplies for irrigation or municipal water supply.

You are able to see right away the reason there is nothing in the Far West. This goes back to the runoff map.

If you have no surface water you cannot store it or irrigate with it.

So we find the program heavily concentrated in central Kansas.

As you go to the east and get into the heavy rainfall belt, there is intense irrigation interest in the area. We must realize the irrigation needs are more supplemental in nature and probably that irrigation for some time to come will be confined to individual well or stream bank type of installation.

Here on this chart the black again are the reservoir projects completed, or under construction.

The green are irrigation units completed or under construction.

The purple again are projects that are authorized, and the blue projects that are subject to some sort of an investigation currently.

The estimated cost of those projects completed or under construction or authorized is approximately $185 million.

This last chart does not exactly represent specific Federal project activity. But there is no question but what the passage of the Hope-Aiken legislation would increase the possibility of the tremendously expanded Department of Agriculture program in the State of Kansas.

The CHAIRMAN. Would you repeat the first part of that sentence. You said, "There is no question"——

Mr. SMITH. There is no question but what the passage of the Hope-Aiken legislation will set the stage for appreciable expansion of the U.S. Department of Agriculture activity in Kansas.

The CHAIRMAN. What is the Hope-Aiken legislation?

Mr. SMITH. The Hope-Aiken watershed program of the U.S. Department of Agriculture.

The CHAIRMAN. Is that what we call Public Law 566?

Mr. SMITH. I am sorry. Public Law 566, that is right, Senator.

The CHAIRMAN. Yes.

Mr. SMITH. As amended, and so on.

The CHAIRMAN. Since I helped write it in the Senate, I am glad to know the name of it.

Mr. SMITH. No comment.

This particular map instead of showing Federal projects happens to show or represent the original activity that we have among the rural watersheds in trying to organize watershed districts under a State enabling legislation, and you will find three colors on this map.

The five small scattered points in blue are the districts that actually had programs developed under the pilot watershed act in the early fifties.

The green areas show that particular portion of the State that is now officially organized as a local entity of government of watershed district.

And again, the purple areas that we know to be considering organization or in the process of organization.

We have done appreciable work with the Soil Conservation Service. In fact, they have done a good share of work for us on this matter.

It is the present estimate of the Water Resources Board that under existing legislation the structural phase of this program could actually be applicable to as much as 40 percent of the State.

It is too early to get a firm structural figure.

I think an estimate of $500 million for such ultimate development would not be too far out of line.

I should like now to return and finish some specific comments in the prepared paper.

Before leaving the subject of the various Federal development programs in Kansas, as you might measure them by currently authorized activities, I think we must make this observation.

How effective these programs will be in meeting the need will depend on the if's, and's, when's, installation is completed.

Certainly there can be no question but what the installation of these several Federal programs would bring to many Kansas valleys and communities a stability not heretofore possible in the form of reduced flood threat, and in some instances improved local water supply.

Just as assuredly, these programs would provide a number of secondary benefits, not the least of which would be an appreciable increase in opportunity for water-related recreation.

All water problems cannot be resolved nor can all future problems be anticipated. There are several areas, however, where present activities will not fill the bill, and these gaps should be recognized by all levels of government.

Moreover, this recognition should be formally reflected in future administrative or legislative policy, whichever is appropriate.

The day is coming when fresh water will bring premium prices and present pollution abatement programs directed at protecting our fresh water are only the initial step.

Improved methods of handling inorganic wastes are necessary to minimize streamflow dilution requirements for a growing society.

Obviously, the question of waste disposal of radioactive materials will be of increasing concern.

It is understood that the committee is seeking special reports on these subjects, and certainly such action is timely.

Neither Kansas nor the Nation can afford to disregard the dominant percentage of the water budget that is devoted to satisfying evapotranspiration requirements. Any measurable progress in reducing this requirement could have far-reaching effects on the overall water supply picture.

The problem presented is one of basic research in soil plant water relationship, and possibly one of expensive research.

The potential benefits and the relative need, however, are such as to justify extensive exploration.

Undoubtedly, the need for such activity stands out in a State like Kansas where agricultural moisture can be so critical and where the available water supply for other purposes, both now and in the future, appears to be limited.

Moreover, long range depletion of the ground water source now being used to supplement agricultural deficiencies gives added cause for concern in Kansas and throughout the High Plains area.

Evapotranspiration is the big water user nationwide, and this fact cannot be overlooked in any long range policies governing water utilization. A comprehensive research program directed at reducing the overall evapotranspiration requirement should be initiated.

And I am sure you will hear additional testimony on this item on your section on water and agriculture, Mr. Chairman.

At the present time, none of the Federal assistance or development programs appear to be meeting the need for rural domestic and livestock water to the degree that is desirable.

This is true even though the State provides additional assistance in the form of a tax reduction benefit for those individuals constructing adequate storage facilities. The problem is intense in Kansas, as witness the water hauling costs cited earlier.

Several factors are involved, among which are the lack of ground water, poor reservoir sites at points of need, high evaporation losses, and the inability to obtain adequate financial credit.

There are several steps which apparently could be taken which might be of assistance:

First, present experiments on the use of monomolecular films to reduce pond evaporation should be concentrated on the farm pond type structure where the wind problem is at a minimum and where the evaporation demand represents such a significant portion of the total water demand placed on the pond.

Second, the agricultural conservation program policy should recognize so-called headquarter ponds—impoundments at or near ranch or farm headquarters— as eligible for conservation assistance; a recognition it does not grant at the present time.

Historically, there has been one basic shortcoming in Federal development programs, that is failure to utilize to the maximum the potential of all reservoir sites largely by failure to develop water supply storage unless there is an immediate and identifiable need.

There is a definite need to incorporate long range water supply considerations in all Government development policies.

Reservoir sites constitute rare, important, and nonrenewable resources, and how they are developed and utilized will in the long run determine the ultimate adequacy of the surface water resource.

A brief discussion of the situation here in Kansas will serve to illustrate the point.

In earlier discussion on proposed major reservoir developments in Kansas, it was noted that the projects in central Kansas had as primary objectives the development of irrigation and municipal water supplies.

By contrast, those in the eastern portion of the State were indicated to have as primary objectives the development of flood control and no reference was made to water supply.

The difference in project planning represents primarily the difference that existed until just recently in national reclamation and flood control legislation.

The matter becomes of concern in considering the possibilities for future economic growth in Kansas. Water for agriculture and flood control for rural and urban dweller alike, will bring a stability to present an opportunity for economic growth.

However, the bulk of population growth is going to have to be urban and is going to have to be based on industry of one type or another.

Industrial growth is going to require water and the opportunities for increasing the firm water supply are limited.

Against this background, the Federal Water Supply Act of 1958, providing authority to include provisions for future municipal and industrial water supply in Federal reservoir projects, was a welcome step.

The CHAIRMAN. For your information, that was the Kerr-Case amendment.

Mr. SMITH. We recognize it.

In the opinion of the Kansas Water Resources Board, it was an appropriate step for present State planning studies to indicate the desirability of providing such water supply.

Accordingly, the water resources board and the Federal agencies have been giving considerable study to the possible application of that act to the various projects in Kansas.

On the basis of consideration to date, several observations appear appropriate.

The practical application of the objectives inherent in the 1958 act will depend on future congressional guidance and executive administration thereof.

If, for example, the administrative implementation does not reflect a relatively liberal interpretation of the non-Federal assurance requirement, positive accomplishments may be meager.

This is true because State and local interests must resolve the basic financial and legal questions posed and in many instances this will take appreciable time. Such questions always require time and patience and in the present case will be more difficult of resolution because the issue involved is future supply rather than immediate need.

In the meantime, other pressing functions to be served by the projects dictate desirability of early development.

It should be clearly understood that no quarrel is offered with the basic Federal position that the governmental unit or individual who eventually uses the water should repay the storage cost. This is no

more than in extension of present policies and is compatible with Kansas water law.

It is to argue, however, that neither Kansas nor the Nation is rich enough waterwise to commit reservoir sites to development without making provision for future water supply.

A reasonable presentation as to the ultimate need for such water and a showing that development costs are favorable in comparison with other alternatives for future supplies, should be enough to justify Federal actions which will help preserve the resource for future use.

Finally, it would appear that ultimate repayment in such cases is fairly well guaranteed. Non-Federal interests would have little doubt as to their ultimate repayment responsibility and certainly they would have few illusions as to who could retain operational control of the available storage until repayment was forthcoming.

Before leaving this subject, reference should be made to the fact that the Water Supply Act of 1958 does not apply presently to the U.S. Department of Agriculture programs. This appears to be inconsistent with the basic concept of the watershed legislation which allows up to 5,000 acre-feet for flood control and 20,000 acre-feet allocation for water supply in any single structure.

There are many communities below 5,000 population that might avail themselves of the opportunity for future storage in connection with this program, but cannot incur such costs now.

Obviously, the watershed district cannot be expected to develop such storage for the use of others. At the same time, watershed activities should not be allowed to usurp sites which could be used for future water supply.

Extension of the principles embodied in the 1958 Water Supply Act to the watershed program would appear to be desirable.

The CHAIRMAN. Does not Public Law 566 provide for the construction of 20,000 acre-feet of storage by the Federal Government with its cost on a basis whereby local water users, either municipal or irrigation, do not provide any of the cost of building the project, but make a contract as in the nature of a loan, with the only security its agreement to buy the water as it is available?

Mr. SMITH. That is true, Senator, but you normally have a 5-year project development stage. Then you are at the point of starting your repayment.

The CHAIRMAN. May I say that I cannot be in more complete agreement with you. I am happy to have your discussion of it. It happens that that provision in that act was my amendment. And George Aiken never saw it until it hit the Senate floor and I had to explain it to him before he would agree to support it.

We made the act as broad in its application as was possible and still avoid a veto. In fact, we made it a little broader than we were told it could be and avoid a veto.

But I am delighted to have your discussions of it because this is one of our main purposes. I am of the opinion that your own distinguished Senator shares this view and will participate in the effort to broaden it so that it will be more available and more effective, because there is not any more sense to requiring that a municipality that is going to be built on the basis of the industrial water supply available to it will either provide a bankable note or contract for the participation in it than there was to require that Oklahoma City give

a bankable note to help build the Santa Fe Railroad though it was going to produce the traffic and had to be built on the basis not of the existing traffic, but as of the traffic which would be produced upon its being built and operated.

Mr. SMITH. This is the crux of the problem. It is a problem of initial credit.

The CHAIRMAN. Yes.

Mr. SMITH. I said a moment ago we do not quarrel with the concept of ultimate repayment. It is the initial credit that is on the resource conservation.

The CHAIRMAN. I am very glad to have your discussion of that and I know Senator Schoeppel is, too, because that is an area in which both laws and other pieces of legislation in connection with this matter must be recognized and provided for in the manner that will make them utensils of development rather than mirages.

Senator SCHOEPPEL. I might say, Senator Kerr, that we have a situation right now in the State where we have a number of areas and communities that are involved with the importance of this very thing.

Mr. SMITH. May I go on now?

The CHAIRMAN. Go ahead.

Mr. SMITH. Programs for the measurement, analysis, and publication of basic hydrologic data, topographic and soil mapping will have to be accelerated. Refinement of present knowledge will have to be provided in response to growing water needs. In addition, I would like to direct your attention to the fact that there is a tremendous need for the development of economic base data on the relative value of water for various purposes as a guide for not only water development, but water administration.

We need to know about the relative value of water for various purposes.

Data programs must be maintained in a vigorous and up-to-date manner; otherwise future development cannot hope to have an adequate factual foundation.

Coordination of water resources development is a must if significant progress is to be made.

Much has been said and written about the subject and there are admitted problems in the several areas of intergovernmental, interstate, interagency, and interuser relations.

It is to be hoped that the work of the Senate select committee will lead to constructive congressional action relative to several of these matters.

One fact is most clear: Until there is a firm establishment of Federal policy, it is improbable that 50 separate States and their many local entities, will uniformly arrive at programs equally compatible with Federal operations. Congressional legislation which would clarify Federal and non-Federal responsibilities and prerogatives in the various phases of water resources development would be most helpful.

Coupled with this, of course, is the problem of delineating agency responsibilities and establishing consistent and uniform policies relating to project development.

Such legislation by itself, however, is not enough. It must be accompanied by some congressional expression of the degree to which the Federal Government would then expect to meet its pronounced responsibilities.

I say this because Federal actions may not be the dominant development operation everywhere in the country, but certainly it is significant everywhere. Until the non-Federal interstate and local units can place in perspective how rapidly the Federal action might be expected, it is very difficult for the other units of the Government to establish any long-range programing of their activities.

Intergovernmental and interagency coordination matters would be further clarified if there were some way of maintaining a rather detailed prospectus of Federal intentions for the short range future. Congressional guidance would be most helpful. It would be of extreme help if at the time Congress considers annual appropriation requests, it could also give a tentative indication of program schedules for as much as 10 years in the future.

I realize this is a difficult request to comply with.

The CHAIRMAN. I would hope we would not have to postpone the gradual settlement of our problems until they could be met with the suggestion you made there.

Mr. SMITH. What we are interested in here is this situation—just because a project is authorized it may or may not mean it is going anywhere under our current statutes.

We have, of course, in certain instances local units of Government that might be cooperating in certain phases of project development.

The earliest possible indication they can have as to when construction is liable to be firmed, gives them an opportunity to put their own financial house in order on a firm basis.

Certainly, as much lead line as we can give with the general Federal intention here is helpful to other governmental programs such as highway development where we occasionally face problems of possible relocation due to project development, or perhaps rehabilitation of existing facilities which eventually would be affected by project development.

Kansas being an inland State is vitally interested in and affected by regional type developments. The construction and operation of the Missouri Basin development program is of concern not only as it relates to those projects located within Kansas, but also as it relates to the construction and operation of those projects which materially affect water control and water use on the main stem of the Missouri River.

Similarly, Kansas has a fundamental interest in the development programs of the Arkansas River Basin. For some time there has been a growing recognition nationwide that the planning and development of water resources projects must be weighed in light of basinwide and even regionwide needs.

Undoubtedly, this is an area where coordination is extremely vital and where it has to continue to operate in the years ahead.

There have been a number of proposals submitted to Congress on this subject from time to time. A number of these proposals would establish river basin commissions to coordinate water resources development activities.

The need for both ample regional coordination and maintenance of interstate harmony must be recognized if maximum utilization of available resources is to be attained.

Historically, Kansas has turned to interstate compacts for resolution of interstate conflicts in water use.

Admittedly, compacts do not accomplish regional planning in themselves. Instead, they provide a framework within which regional development can take place.

It appears doubtful that legislation establishing a formal mechanism for regional coordination would necessarily provide interstate harmony unless it:

1. Recognized the authority of interstate compacts;
2. Provided for adequate voting representation by the States involved.

In recent years, substantial concern has developed throughout the Nation over the relative status of State water rights. This concern has developed in response to several recent judicial decisions and the apparent administrative interpretation which has been or might be placed on these decisions.

This subject could cause serious problems in the field of intergovernmental relations and if not firmly clarified could well impede the progress of water resources development.

The heart of the concern, of course, involved the fear that Federal operations will not recognize the status of those rights vested and acquired under State water law. The matter can and should be resolved by Congress in legislation which would spell out Federal recognition of the rights of the States to administer the use of water within their boundaries, and which makes it clear that there will be no Federal usurpation of those rights established under State water law without proper compensation therefor.

In conclusion, I wish to express the appreciation of the Kansas Water Resources Board, the division of water resources, State board of agriculture; the division of sanitation, State board of health; the State geological survey, and the Kansas Agricultural Experiment Station, for this opportunity to present to you a résumé of some of the major water considerations in this State.

I trust that the above remarks have given you some insight into the nature, extent, and scope of Kansas water problems, and that they will be of assistance to you as you listen to subsequent testimony today, and as you continue to deliberate the far-reaching and important responsibilities which the Senate has delegated to you.

Thank you very much.

The CHAIRMAN. Thank you, Mr. Smith.

How much circulation has the Arkansas-White-Red River Commission report had in Kansas?

Mr. SMITH. Outside of official Government circulation, sir, very little.

The CHAIRMAN. That was a program jointly sponsored by Senator Schoeppel and me when we went to Congress in 1949, and we found it of great significance in Oklahoma.

I just wondered if it had been so regarded in Kansas.

Mr. SMITH. I would say it is being used extensively, sir, in our own State water plan studies and data from it has been circulated, but as a formal presentation, no, but only around governmental circles.

Senator SCHOEPPEL. Thank you very much, Mr. Smith, and your associates here who collaborated in this matter. We are genuinely appreciative of it.

The next section of our presentation here will be the general statement concerning water and agriculture. I am happy to have here for the matter of presenting that, Donald Christy, of Scott City, Kans., member of the State board of agriculture and the water resources board.

Mr. Christy, we are glad to have you with us.

STATEMENT OF DONALD CHRISTY, SCOTT CITY, KANS., MEMBER, STATE BOARD OF AGRICULTURE AND WATER RESOURCES BOARD

Mr. CHRISTY. Thank you, Senator.

Mr. Chairman and gentlemen, Senator Schoeppel has introduced me and I would dispense with that part of it.

I would like to file for the record a statement from the Kansas State Board of Agriculture as part of its presentation and will only touch on that briefly in our part of it.

Senator SCHOEPPEL. That will be permitted.

Mr. CHRISTY. Thank you.

(The statement referred to follows:)

STATEMENT BY DONALD CHRISTY, MEMBER, KANSAS STATE BOARD OF AGRICULTURE

Mr. Chairman and gentlemen, my name is Donald Christy. I am a farmer with some experience, both practical and professional, in the fields of soil and water. I appear here today as a representative of the Kansas State Board of Agriculture which has the duty of promoting and encouraging the development of agriculture in Kansas. This department is responsible for administration of some 40 Kansas laws—these including most of the State laws dealing with agriculture, as well as a number of other laws. The chief engineer of the division of water resources of the State board of agriculture has the responsibility for the administration of all or part of the Water Appropriation Act and laws pertaining to irrigation districts, watershed districts, drainage districts, farm ponds and levees.

Mr. Robert L. Smith, executive secretary of the Kansas Water Resources Board, and representatives of other State agencies, including the board of agriculture, have been heard and have filed with your committee a great deal of the immediately available material including the publication "Water in Kansas." We want to offer to your committee any additional material which our department can supply if you should so desire.

Kansas is basically and primarily an agricultural State with 90 percent of its area in agricultural production. The predominant use of water in Kansas is by agricultural crops dependent upon soil moisture. But do not forget, the livestock production income is equivalent to that of crops. The quantity of water used is relatively small but the return for its use is high. The best pasture *without water is worthless.*

I want to elaborate briefly on some of the aspects of the administration of the Kansas Water Appropriation Act and to emphasize the importance of water to agriculture, *especially as it applies to the Great Plains section of Kansas.* Later speakers will present the importance of water to agriculture in other *parts of the State.*

ADMINISTRATION OF WATER RIGHTS

Kansas law recognizes as vested rights all uses made of water prior to 1945. Water under such rights may continue to be used under the common law rule. *Rights to the use of both surface and ground water, established since* 1945, are subject to the appropriation doctrine and the rule of priority of right. This *law is administered by the chief engineer of the division of water resources of* the Kansas State Board of Agriculture through a staff which includes personnel in his office and in four field offices.

Water use rights are property rights. This security is the basis for the development of the remainder of the State's unused water resources. Water development requires substantial investments on the part of those who undertake it, whether they be an individual, a corporation, a subdivision of State government, or an agency of the Federal Government. Assurance of protection for investments made for the purpose of water use demands orderly development of water resources. This is well covered by State law. The U.S. Government should also remove all doubts as to the property rights established by the use of water. Federal law should require all agencies of the Federal Government in connection with water development projects to establish water rights under State law as is the case for land.

The administration of rights to use of ground water often becomes complex. This involves the interrelation of surface and ground water, questions pertaining to specific yield, aquifer limits, storage capacity, the effect of withdrawal, and recharge rates. In the absence of extensive geological surveys, questions of impairment of rights to the use of ground water are extremely difficult to determine. The work of the U.S. Geological Survey in its cooperative program of ground-water resources investigations provides the best basis for dealing with these problems. This agency is conducting an excellent program in Kansas from which considerable useful information is obtained. In the light of rapidly expanding ground-water use there is urgent need for a corresponding acceleration in ground-water mapping and inventory.

The urgency of the need is clear. Kansas Great Plains irrigation development has doubled every 2½ years since 1946. During prolonged drought periods, irrigated acreage has doubled every year and a half while, during the wet periods, the development has slowed to doubling every 5½ to 6 years. Apparently this rate will continue until the supply of water, the irrigable land, or economic factors bring a halt. There is a serious possibility of overdevelopment which would impair long-term possibilities. The rate of expansion has slowed for the present, but State agencies dealing with water anticipate a high rate of development again if and when drought conditions return.

In exhibit No. 1 you will note the rather slow rate of application for water rights immediately after the 1945 law was passed, then the rapid acceleration in application during the dry years of the 1950's. The rate has slowed during the past 3 relatively good years. Credit has been restored by the bountiful crops of 1957, 1958, and 1959. This, coupled with the demonstration of the practicability of irrigation in new areas would lead one to believe that with another drought a new surge of development could be expected. The gently and uniformly sloping soils of the Great Plains of Kansas need only water to make this one of the more productive areas of the world. Most of the better land is in cultivation now. Only the sand-hill areas, the sandier land, and the steep land near the few streams remain in grass and native vegetation. This attractive easly farmed land has established a 15-bushel average wheat yield per harvested acre, a yield only slightly below that of the rest of the State. The 16-bushel grain sorghum yield is about 4 bushels per acre below that of corn in the State. The advent of hybrid sorghums promises a yield similar to that for corn. Under irrigation, wheat yields are averaging about 30 bushels per acre with highs of more than 90 bushels per acre. Many of the better farmers are aiming successfully for 100 bushels per acre for corn and grain sorghum. Top yields are approaching 150 bushels per acre for both.

The Great Plains seems to be committed to an agricultural economy unless *some means for the disposal of waste from people and industry is developed.* Surface water has been the efficient, practical method used by most great cities and industries. Since there is little surface water available to the area, the economy must necessarily be limited to agriculture and some light industry.

The complete development of every acre of irrigable land under which there is *sufficient water for irrigation is similar to a mining operation. The limited* recharge from the surface plus the slow movement of the groundwater into the area means that the area will have a relatively short life as an irrigated area. The amount of recharge is small and the flow of the so-called underground river is incredibly slow. (Groundwater at normal gradient probably

flows less than a few hundred feet per year. I use 50 years per mile.) Even with the increased gradient caused by pumping, the areal depression of the water table in the city of Wichita's well field, located in the free flowing Equus beds north of that city, has only extended out 5 miles in about 15 years. The slow movement of groundwater also limits effectiveness of recharging the groundwater to the immediate vicinity of its use. Recharging groundwater at a point 20 miles from the place of expected use is ridiculous. Twenty miles times 50 years per mile says that it would take 1,000 years for the recharged water to become available.

THE FUTURE OF THE AREA

The goal of the Great Plains should be to double the agricultural production during the next 20 years.

CONTRIBUTIONS THAT THE U.S. GOVERNMENT MIGHT MAKE

There are four ways in which the U.S. Government might make major contributions:

1. Increase research on the basic factors that affect the efficiency of water use.
2. Help the States determine the quantity and quality of available groundwater.
3. Economic research to the end that agricultural products may return to the producer a reward commensurate to the costs and risks of production.
4. Continue the investigations on weather control and modification.

Research of the factors that contribute to the efficiency of water use by agriculture

Studies of the storage and conservation of soil moisture attracted a number of research men during the early part of the century. This interest has lagged until now only exploratory research remains. Some of this exploratory research indicates that where water is applied to the soil in deep furrows, more water remains in the soil at the end of 30 days than when it is applied in shallow furrows or on a smooth surface. The effect of cultivation on the retention of moisture needs to be explored. There was a time when the "dust mulch" was considered an effective way to reduce the evaporation of water from the surface of the ground. It was found, however, that the mulch was as effective a seal against moisture intake as it was against moisture loss. With the present state of knowledge, definite proof that the dust mulch was an effective seal would contribute considerably to the progress of this area. It has been stated that the stubble mulch was effective in preventing the evaporation of water from the soil, but some recent research suggests a question on this point. The stubble mulch does reduce evaporation during the daytime but it keeps the soil warmer and evaporation continues during the night, so that at the end of a period of time evaporation from bare soil and mulched soil is about the same. Some of the paper and film mulches are effective in the prevention of evaporation from the soil and have helped to greatly increase crop yields, but are too expensive.

"Water in Kansas" points out the value of moisture to plants. A small increase in the water available for plant use, or a small decrease in the evaporation losses should go a long way toward increasing the stability of income and help to reduce wind erosion and drought damage. An extra inch of water available for use during drought periods would do much to supply the cover needed for the protection of soil against wind erosion.

The efficiency of the plants themselves is important. If the hybrid sorghums increase the yield 25 percent over standard varieties, this in effect is just the same as increasing the efficiency in the use of moisture. New varieties of wheat have been, are being, and will be developed to the end that more efficient use of moisture will result.

The quantity and quality of groundwater

The Division of Water Resources of the Kansas State Board of Agriculture has cooperated with the Kansas Geological Survey and the U.S. Geological Survey in making preliminary surveys of much of this area. Studies indicate the extent of the groundwater and the depth to and thickness of the aquifer. If effective administration of the water law is to be attained, the amount of water in storage, its rate of movement, the rate of recharge, and the specific yield must be more accurately determined. The big problem in the administration of groundwater law is the cost of proof. Without rather thorough information it will be almost impossible to develop this water to its fullest long-time use. A complete inventory of this valuable asset might be of extreme value in time of war or during other major emergencies. In the attached exhibit No. 2 you will note the hydrographs of four wells. ("Groundwater Levels in Observation Wells in Kansas, 1957," Bulletin 131 of the State Geological Survey of Kansas.) The top hydrograph shows the effect of pumping on the water level in a well. The wavy line shows the annual effect of pumping. The downward trend shows what is happening to the water level in that well. The Scott 2A shows the downward trend, then the recharge effect of the wet years of 1950 and 1951. Note the resumption of the downward trend from 1952 through 1957. I am sure that the rainfall of 1958 and 1959 would show a recharge similar to that of 1950 and 1951.

Considerable groundwater in Kansas has been ruined by past practices in the disposal of oil field brine. The brine ponds leak into the groundwater where the pollution may remain relatively stationary or it may migrate. When pumping starts in the vicinity, the brine-polluted water eventually ruins the fresh water or seriously impairs its value. Unplugged drill holes or natural connections between the aquifers act in the same way. When the pressure of the overlying water is removed the brine flows up into the fresh water. Let me reemphasize the point that not all of the pollution is man made. If we are to effectively protect the good water supplies, research on the control of groundwater pollution must continue.

Economic stability

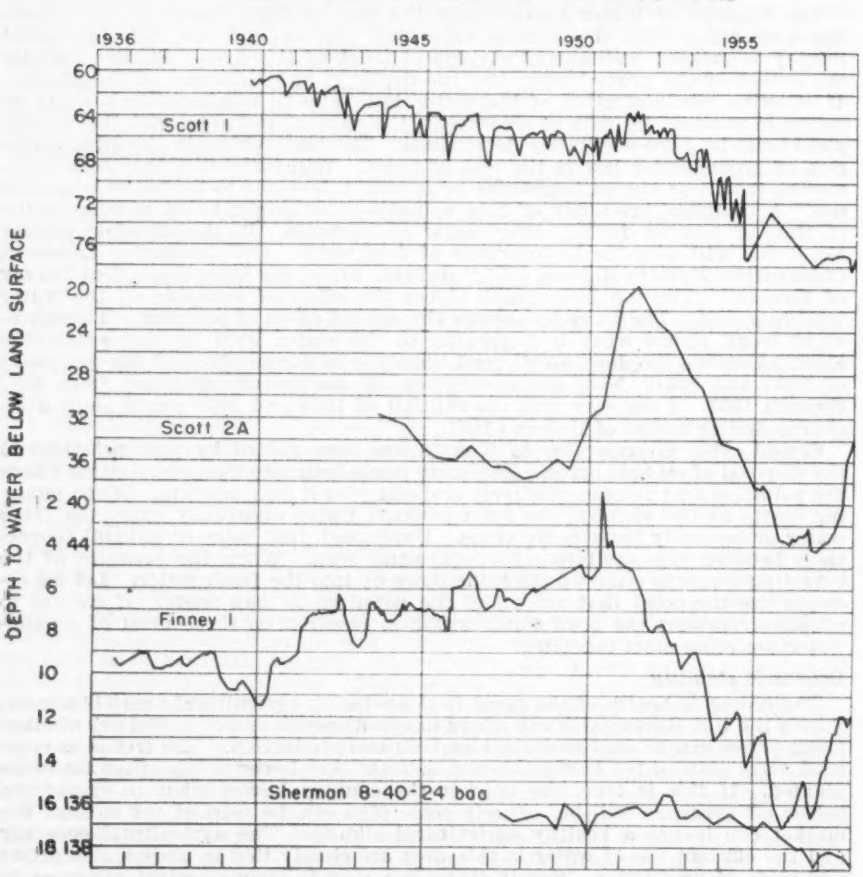
The economic health of the great food-producing agricultural areas is a must. Surely the U.S. Government can afford to spend enough money to find out whether lower prices can be used to control agricultural production. The trends in cropland acres planted for harvest do not indicate that lower prices affect the acres planted. If this is true, the quicker the country knows what to expect the better off everyone will be. Surely some plan can be worked out so that the market can insure a healthy agricultural climate. The agricultural economy and the efficient use of water in this area are closely tied to more stable prices and costs of production. Surely there is a way to insure against extremes in market fluctuation and a means of insuring adequate returns to the end that the economy of the area can be kept sound.

Irrigation helps to insure feed supplies to the irrigated and to the surrounding dryland areas so that livestock liquidation is not so severe during drought periods. Feed available also tends to alleviate the overgrazing of the surrounding dryland areas by supplying feed for those areas.

More of the feed grains produced in the area should be fed there. At present that trend exists. A number of large livestock feed yards have developed and the numberof livestock fed by farmer-feeders is increasing.

Weather control and modification

Studies in this field to date do not indicate much promise for this area, but the possible rewards are so high that the possibilities of control should be studied continuously. Anyone who has worked with weather modification cannot help but feel that there are real possibilities in this field.



Mr. CHRISTY. As you gentlemen know, agriculture in Kansas is our major industry as of yet.

Now, in our presentation here this morning, I would like to mention just a few of the items that affect the administration of the water law in which we have the responsibility.

One of the things that bothers us considerably is the administration. Ground water and the administration of law with respect to ground water has been one of the most difficult of all types of administration. I think the reason for that is clear. The cost of proof is so high that it is almost impossible to determine who did what to who.

Now, we have a fair preliminary map of major ground water resources of the State, but we find that much more is needed if we are to get the job done.

As you fellows know, the big part of the western part of the State has been mapped, irrigation has developed rapidly, and I might say that it is almost spectacular.

If I may move to the chart just briefly, I would like to point out one thing that I think will help explain that fact, with your permission.

Senator SCHOEPPEL. Surely.

Mr. CHRISTY. Irrigation in the western part of the State is not new. If you read something of the history of the western part of the State, the early concept of course, was streams and some of the early promotions, they actually built canals clear down to Ford County, way on down here, trying to develop irrigation.

Of course, the Arkansas River was short of water for the then dreamed-of development. At that time they knew little of the underground sources.

Then about 1906, 1907, and 1908, in the Scott City area, which happens to have some very shallow water, a man by the name of Lowe started to try to determine whether irrigation was feasible.

They dug wells and started the irrigation back in those days. That irrigation developed slowly for quite a period of years there. Know-how is important.

All right, in early 1940's, when the original Kansas law was declared unconstitutional, the then Governor Schoeppel got the law through on our present appropriation doctrine. That law required a filing of a permit or request for permit to use water.

Now, just to be brief, this is a map. These red areas show the number of acres for which people have filed for water in this area.

If you total the three, and, incidentally, there is a chart in the back of the exhibit, these three represent approximately a million acres, 900,000 to be exact, at the present time.

The rate of interest has doubled about every 2½ years, in periods of drought it has been every year and a half and in periods of wet weather it is about every 5 or 6 years.

The thing that concerns me about it is this: If we get another drought with the fact that we have had some reasonable crops in recent years from the standpoint of yields, I would suspect that this curve will turn up greatly and there is no way on earth to get enough water to irrigate all of that land that has that much water under it and still have a long-time irrigation potential.

They can have a lot of irrigation and, I might say, it might be almost indefinite, but if they get too many wells in too small an area, they cannot do it.

In other words, I will not argue with you whether the amount of water you get in recharge from surface and that is where most of that comes from, is 1 inch a year or half inch a year.

It is immaterial. When you take 2 feet out every year to irrigate land and you only have 18 inches of rainfall, there is a deficit that is definite.

You go to the other part of it and that is the fact that underground water moves slowly. Wherever you talk about an underground river that is fine.

Did you know that water moves as slowly as 50 years to the mile. Sure, there are areas somewhat above that. But I think here, these recharge some place up here, to do me some good.

Twenty miles away, 50 years to the mile, that is 1,000 years.

It doesn't make any difference. That isn't going to work. It moves so slowly, if you develop——

The CHAIRMAN. Do you have accurate figures on the reduction in your water table on the lowering of it?

Mr. CHRISTY. We have nothing that we can really tell about, Senator. That is one of the things that I think you gentlemen can do that will help a lot, is cooperate with these States in finding out the fundamentals of what we can expect.

In time of national emergency, it might be vitally important to know just what we can expect and how long we can depend on it even at a forced draft.

If you wanted to put it that way. In other words, if we need food badly enough during war periods or something like that, we could use a number of feet of this water and if we could cut back on it at a later date, it would partially come back over a period of time.

There are areas where they have so-called pumped dry. Quit pumping a few years and migration of water in has brought some irrigation water back.

Accurate figures, no. We made some preliminary surveys in the Water Resources Board and we found there was some indications that we were in trouble.

(Information received subsequent to the closing of the hearings indicates the drawdowns, according to preliminary studies, is from 5 to 30 feet.)

The CHAIRMAN. You no longer permit the drilling of wells and the using of water for irrigation except where permission is given following an application for it?

Mr. CHRISTY. That is not quite exact. Actually, that was the general intent of the law.

However, I, as an individual, could put down a well without application, but if anybody complained then I could be stopped immediately and would have no recourse whatever.

The CHAIRMAN. Has a pattern developed, say, of what percentage of the acreage in each section could be adequately irrigated from the water under the section?

Mr. CHRISTY. Actually in this area here we suspect that there is close to 150 million acre-feet of water in storage, that will produce a lot of stuff.

There is approximately 15 million acres which means that there is 10 feet of water under there. Not all of it can be used for irrigation.

But the thing about it is whenever I start trying to figure out how many wells can be put per section, or how many sections in a block we don't know for sure.

I know from previous experience that there are times when water moves much more slowly than others. I know of areas when the recharge is definite. It is a probability and not very far away that evidently there will be no recharge or it will be insignificant.

We need to know more about it and that type of research, Senator, will apply to all of these Plain States where our soils are laid down under somewhat similar sets of conditions, I am sure.

Now, I think you gentlemen have pretty well heard me bring that out. There is one other thing that I wanted to illustrate, and I am afraid that this is not very well visible to you. There is a copy in the back.

I want to point out a well here, if you were close enough you could see a constant fluctuation in that water level. That annual fluctuation is the effect of irrigation pumping. That is unimportant.

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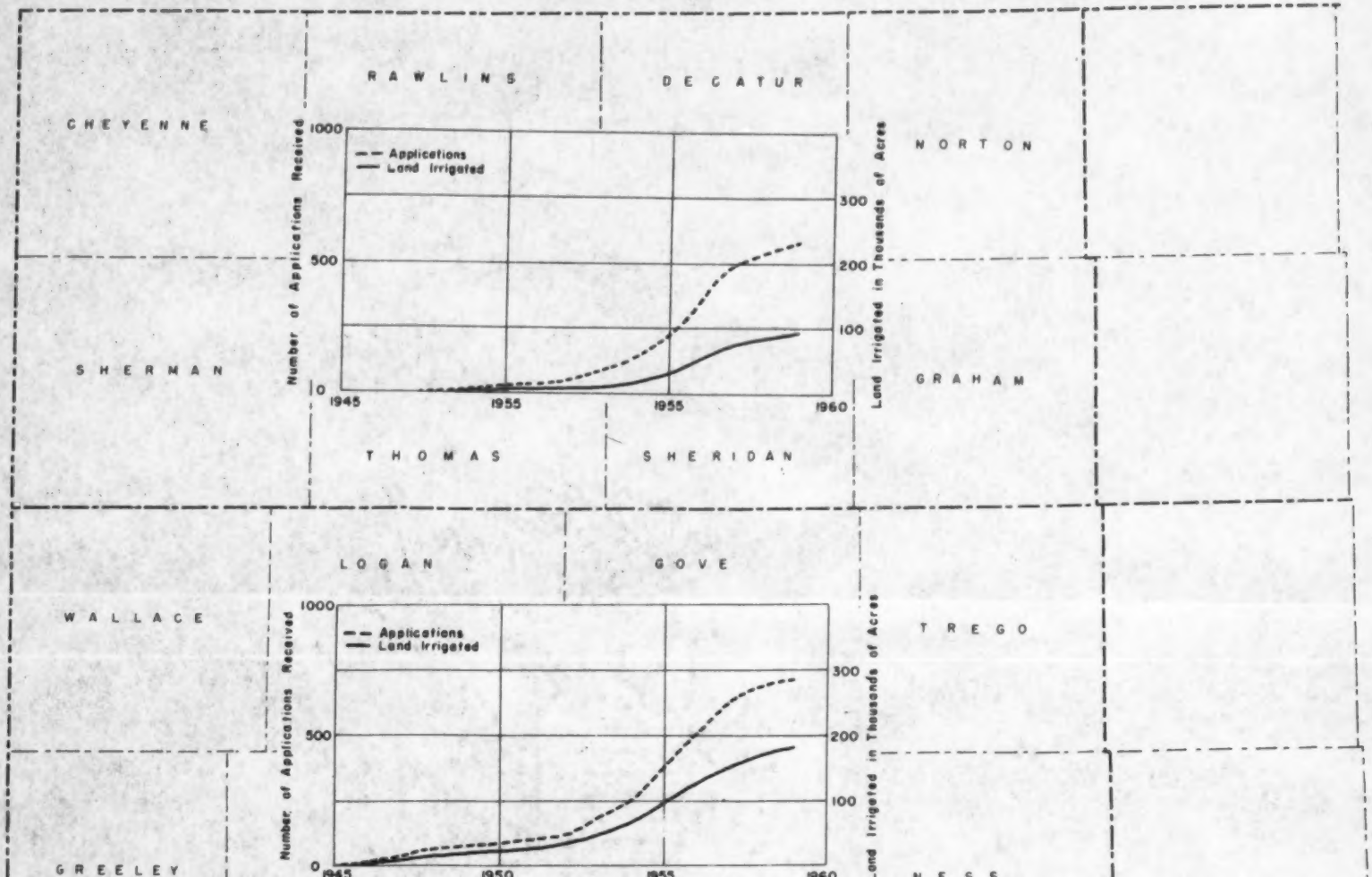
IRRIGATION GROWTH

IN

KANSAS GREAT PLAINS



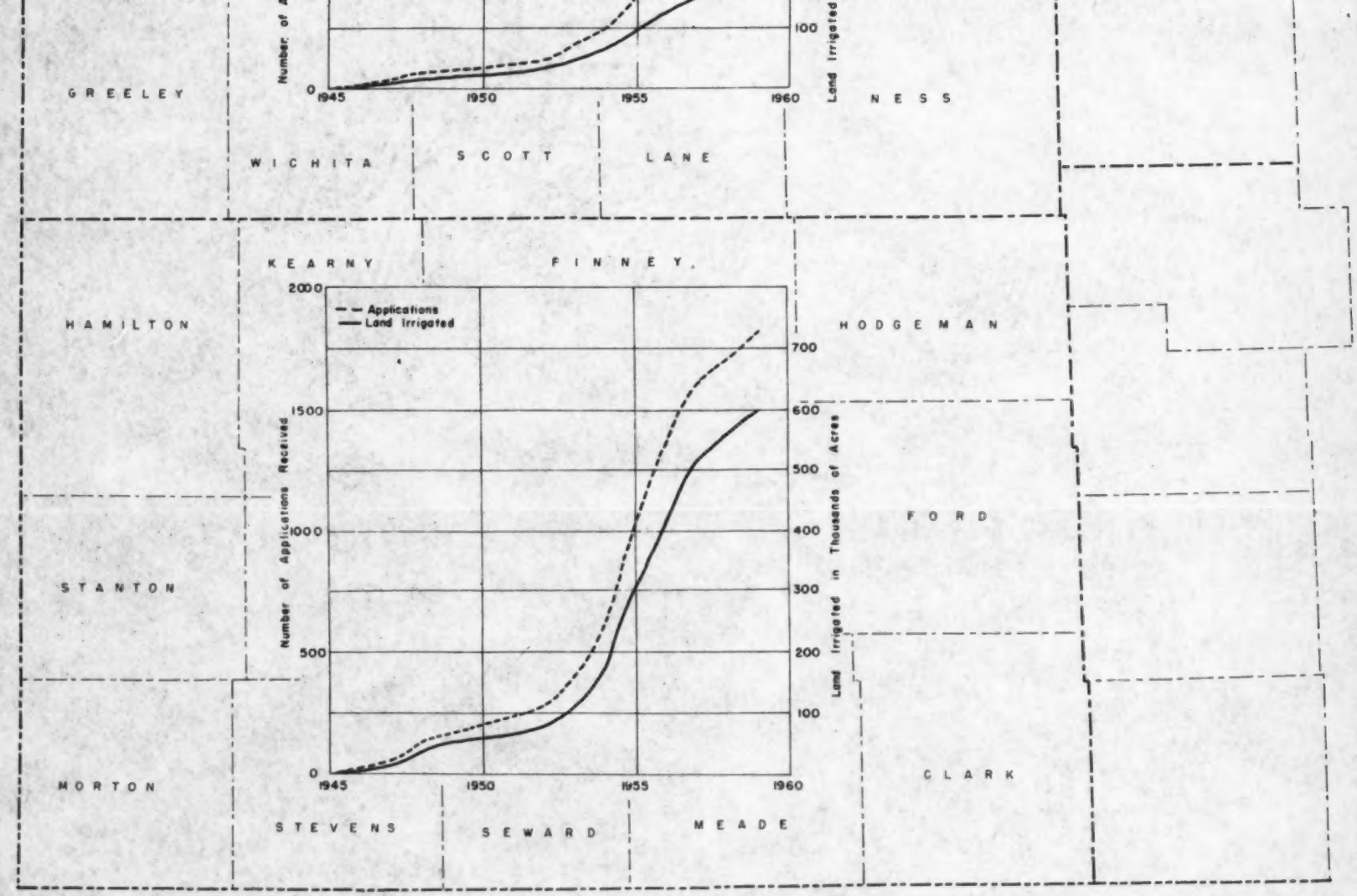


Exhibit accompaning the statement of Donald Christy, representing the Kansas State Board of Agriculture before the U. S. Senate Select Committee on National Water Resources at Field Hearing held at Topeka, Kansas on November 18, 1959

In fact, you can draw the water level down and have a permanent drawdown with no detriment if it keeps coming back to the same level each year, but the best part is that the trend line of that overall picture is downward, meaning that they are taking more out than they are getting back.

The CHAIRMAN. Is that picture of one well?

Mr. CHRISTY. That is a picture of one well and I used it as an illustration——

The CHAIRMAN. Can you tell me how many acres were being irrigated from the floor of that one well?

Mr. CHRISTY. This was not even an irrigation. This was a livestock well, not too far from it. You cannot really measure the drawdown with our present equipment in an irrigation well—and it would mean little.

It would give a badly distorted picture.

The other well that I wanted to illustrate is not far from the first one. Back in this period of before the record started the trend was slightly downward. It is in that same irrigated area.

Then in the rains of 1950 and 1951, you know this terrific recharge. Then after pumping started again, heavy pumping started in 1952. It started back down.

Then the last 2 years the fall of 1957, 1958, and 1959, pumping was down and the recharge was up and I would suspect that that line is still going up.

Senator SCHOEPPEL. Is that over a period of about 5 years on that draft?

Mr. CHRISTY. This period here is from 1936 to 1959.

The CHAIRMAN. Twenty-two years?

Mr. CHRISTY. That is right.

The CHAIRMAN. Proceed.

Mr. CHRISTY. Now, time is running short. There are one or two other items that I would like to bring up before I turn it over to some of the other members of this group.

I believe that you folks can help greatly and it is not just this area, but to add to the knowledge of the total area in four ways:

One of them is increase the basic research that affects the effective use of water.

I have just mentioned the mapping and research necessary to go with the establishment of quantity and there are problems in quality.

Then economics plays a part in the use of water in the Plains. I will not touch upon that.

Then the other thing is weather modification—in other words, I am not sure about the weather modifications, whether or not there is anything to it. There are enough indications and the potential rewards are so high that if it can be done I think we should keep a continuous contact on it.

On the efficiency of use of moisture, there are two or three things that I might help to contribute to the hearing here.

For instance, in the early days of this century, we had a number of men that were interested in the basic research on efficiency and use of moisture. LeMar in California was among the last of these. New Mexico and Arizona took a lead in this sort of thing, a number of our expert stations.

Then we have kind of slowed down on that basic research.

For instance, some of the research indicates that applying water and as far as 9 inches deep, 30 days later you had more water there than if you applied it to the surface or in shallow first.

We have had the so-called stubble mulch. We thought that everyone turned straw over and saw moisture under it, why, that holds moisture.

Some of us asked the question why didn't we get commensurate crop returns or yields under the mulch setup.

Finally in Texas, one of the research workers down there started to try to find out and he discovered that they cut down evaporation in the daytime, but that straw kept that soil warm enough during the night that at the end of 24 hours they ended up with the same amount as if it had been bare soil.

Another thing that came about in the early part of this century, we had the so-called dust mulch.

That was supposed to keep the moisture in the ground. They effectively proved that that, also, sealed against the entry of moisture, but in the light of the percentage if we knew that the dust mulch would prevent the evaporation of soils in years like the spring of 1958 where we had a lot of moisture out of that snowstorm, if we could carry that moisture over it helps to make possible cover and protection of the land.

Now, most of these things Bob Smith has touched on, and these gentlemen that are here with me will touch on others and the first one that I would like to call on is Glenn Beck, of the University of Kansas. He is director of the experiment station and present acting dean of agriculture.

(Subsequent to the closing of the hearings, the following statement was supplied by Mr. Christy:)

A THOUGHT ON WATER-SUPPLY FINANCE

The Corps of Engineers can include storage in reservoirs which they are to construct, if some reasonable assurance can be obtained that someone will pay for that storage during the life of the project. This is a step in the right direction, but due to the fact that precedent has been established that a firm contract with the user must be had the terms of this assurance are now in doubt.

Many towns, communities, industries, and individuals who might be water users cannot raise the money necessary for the inclusion of storage at the time construction is planned. But if storage space were available at the time their need develops they would be willing and capable of purchasing such storage.

Now, therefore, if the Corps of Engineers, and other Government units, such as the Bureau of Reclamation and the USDA, could and would include the maximum economically-feasible storage for future sale, it would be the least expensive storage available.

The history of costs since the country was founded seems to indicate that costs increase at about 3 percent per year. If the storage were included and the interest and depreciation on the extra cost added each year until the storage was purchased, the buyer would be assured of as cheap a storage as they could expect to obtain in the future. This is true if there were comparable sites for development. The U.S. Government would be reimbursed for their costs when the storage was purchased. It would be contemplated that the storage space would be unused until it was contracted. The U.S. Government might be permitted to use this unused storage allocation for flood control, navigation, pollution abatement, or other uses until some contract were negotiated. The sale of the storage space should be mandatory if a purchaser were available.

It appears that many sites even in the watershed districts are being developed without any consideration for the future. Good sites are scarce, and since a site when partially used, places a serious handicap on future enlargement, each site should be developed to its fullest extent at the time of its construction.

In the case of Milford, the Kansas Water Resources Board, finds that there are few communities or industries which have a press for water which will assure a bond issue for the inclusion of storage at the present time. However, if such storage space were available, when needed, it is apparent that they would buy and make use of it before another decade or generation passes. This is a very short time compared to the estimated life of such a project.

In view of the fact that later and later sites provides more and more expensive storage space, it seems that they should be willing to buy the space at a price sufficient to insure a fair return to the U.S. Government.

The Kansas Basin studies will point out that the cheapest storage of water could have been had in the Tuttle Creek Dam project. The studies shows that one annual second foot of water can be obtained in the Milford project at a cost of $100,000 provided the 300,000 suggested storage be included in the project. One annual second foot can be incorporated in the Perry site at a cost of about $64,000. However, at the next most efficient site the cost goes to about $250,000 while in some of the projects the water will cost in excess of $300,000. Thus full development of available sites should be undertaken whenever the growth of the area points to a firm potential future need for the storage space.

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SOME POSSIBILITIES OF CONSERVING WATER THROUGH RESEARCH IN THE GREAT PLAINS

Moisture deficiency is common in the Great Plains. Though everything known about making efficient use of rainfall is practiced by most farmers in the Great Plains, still most of the moisture is wasted by evaporation or runoff. Evaporation is by far the most important. Reliable estimates indicate that about 65 percent of the precipitation in the Great Plains is lost by evaporation and about 5 to 10 percent by runoff. The remaining 25 to 30 percent is transpired through plants. A reduction of evaporation from 65 to 60 percent would save more than 1 inch of water where the average precipitation is 20 inches. Projected over the cultivated acreage of western Kansas (15 million acres), that would be 1,250,000 acre-feet of water—or about three times the total water stored in Kansas' five major reservoirs. (Lovewell, 28,150; Kirwin, 80,020; Webster, 67,790; Cedar Bluffs, 184,740; Kanopolis, 58,038; combined, 418,738 acre-feet). That 5 percent reduction in evaporation would produce $62 million in crops for Kansas or $400 million annually over the 10 Great Plains States. Valuable as water is for crop production, it is more valuable for industrial and urban use.

Research carried out in Kansas already has shown that evaporation can be reduced 5 percent. At Garden City, Kans., a paper mulch was used to decrease evaporation from the soil between sorghum rows in 1938 to 1940. The water saved increased sorghum stover yields to 4,290 pounds per acre compared with 2,000 pounds per acre on the unmulched plots. Yields from mulched grain sorghum plots were 54.5 bushels per acre in 1940 compared with 15.9 bushels per acre on the unmulched plots.

Similar results came from similar experiments at Manhattan, Kans., in 1959 (on the eastern edge of the Great Plains where possibilities of evaporation reduction would not be so great). With polyethylene plastic cloth between sorghum rows to reduce evaporation, Stover yields were 4,568 pounds per acre compared with 3,826 pounds per acre on unmulched plots. And 1½ inches more water was stored in the soil under the mulch.

Those methods are too expensive to be feasible. To develop practical methods of evaporation control, much more basic information needs to be known about the evaporation process. The relationships of soil, plant, and climatic factors must become better known.

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The sun is the basic source of energy causing evaporation. Enough solar energy is received at Manhattan, Kans., to evaporate 92 inches of water a year (62 inches April through September). Not all the sun's energy is used in evaporation. About 10 to 50 percent is reflected back into the atmosphere. About 80 percent of that not reflected back evaporates water from soil or plants if soil moisture is readily available. (A maximum of about 35 inches may be evaporated, if available, during a Kansas summer.)

Much of the solar energy gets through a relatively dense plant cover to the soil below. Measurements at Manhattan, Kans., in September 1959, showed that 45 percent of the solar energy absorbed at the surface of the earth penetrated to the soil. The remaining 55 percent was absorbed by sorghum plants in the field studied. Enough solar energy reached the soil surface to evaporate 0.09 inch of water each day. That equals 2.70 inches a month or 10.7 inches from June through September. Since vegetative cover was maximum when these measurements were made, the proportion of energy penetrating plant cover to the soil was much greater earlier in the year.

A way to reduce evaporation and conserve water would be to decrease transpiration from plants. Plants are notoriously inefficient water users. Most of the water that plants use merely passes through the plants and is evaporated. Measurements at Akron, Colo., in 1914 showed that alfalfa plants use about 835 tons of water to produce 1 ton of hay.

Quite likely new varieties of plants could be developed to use water more efficiently. Treatments to decrease transpiration from plants also could be another approach to the problem.

The Great Plains Agricultural Council, recognizing the importance of moisture conservation in the Great Plains area, has proposed that a research center be established to study this problem. A copy of the council's proposal is attached.

PROPOSAL FOR GREAT PLAINS SOIL MOISTURE CONSERVATION RESEARCH LABORATORY

The Great Plains Agricultural Council proposes the establishment of a research center at one of the experiment stations in the Great Plains for soil moisture conservation research.

The underlying problem of agriculture and of industrial development in the Great Plains area is a recurring deficiency of moisture. This deficiency reduces production and farm income, and increases wind erosion.

Despite the fact that most farmers in the Great Plains attempt to make efficient use of the rainfall they receive, a large portion of this rainfall is lost. Estimates indicate that about two-thirds of the rainfall in the Great Plains area is lost by evaporation alone. A reduction of 8 percent in the evaporation loss, in a 20-inch rainfall area, would result in a moisture saving equivalent to 3 inches of precipitation. It is estimated that such a saving projected over the 10 Great Plains States would have a value of nearly $400 million annually in crop production.

At present, the U.S. Department of Agriculture and the State experiment stations in the Great Plains are giving some attention to soil moisture conservation studies. None of these research organizations, however, has either the resources or the facilities to implement a research program on the major fundamental problems such as the principles involved in the evaporation of water from soils and methods for its reduction. Hence, there is an urgent need for a soil moisture laboratory to study these problems.

The new laboratory would give major emphasis to the underlying processes involved in the loss of water by evaporation from soils and to practical methods of control. Attention would also be given to increasing the intake of water into the soil, to improving the moisture retention characteristics of soil, and to increasing the efficiency of soil moisture use by plants. Basic information resulting from these studies would be used for the development of new field practices for making more efficient use of the precipitation in the Great Plains—and elimination of wide variation in crops and income for the area.

Solutions to the complex problems proposed for study will require the combined efforts of scientists trained in a number of disciplines and working together in a central laboratory with special equipment and facilities. This team of scientists would have training in the disciplines of soil physics, soil fertility, soil chemistry, soil microbiology, agronomy, plant physiology, biochemistry, engineering, electronics, physics, physical chemistry, micrometeorology, and statistics. Adequate subprofessional personnel to assist the scientists would also be essen-

tial. These would include engineering and scientific aids, clerical and secretarial assistants, skilled and unskilled labor.

MAJOR AREAS OF RESEARCH

1. Reducing evaporation losses of soil moisture: Research effort would be directed toward a major discovery on how to reduce evaporation losses from soil. Controlled environmental conditions are especially essential for such research. Such factors as air velocity and turbulence, humidity, radiation and temperature, together with the numerous soil properties, including color, moisture status, structure, surface residue and roughness, crusting, temperature, organic matter content, etc., would be evaluated as to their influence on evaporation losses. The modifying effects of the type and distribution of vegetative cover on these factors also would be studied, especially in relation to their effects on microclimate of the soil.

2. Increasing intake of precipitation and irrigation water into the soil: Controlled conditions would be utilized to investigate the relationships between moisture intake and various physical and chemical properties of the soil, topography, land cover, and rainfall pattern. An evaluation would be made of existing and new methods of land tillage, uses of crop residues, fertilizers, and other management practices with respect to their favorable or detrimental effects on surface and subsurface soil characteristics. Practices would be developed and chemicals and synthetic materials evaluated in terms of their effects on increasing intake of water into soils.

3. Improving moisture retention characteristics of soil: A study would be made of the relationships between soil characteristics and movement of soil moisture. Special emphasis would be placed on film and vapor movement as influenced by temperature and tension gradients. Improvement of existing and development of new techniques for measuring soil moisture flow and water holding capacity of soil would be attempted. Through use of exacting conditions the influence of physical, chemical, and biological soil properties on the dynamics of soil water would be investigated.

4. Increasing the efficiency of soil moisture use by plants: Data concerning the use of water by plants would be obtained under known and controlled environmental conditions. Relationships of plant nutrition and growth to the components of soil moisture stress, osmotic pressure and moisture tension, would be studied. Plant characteristics, such as rooting habits, foliar patterns, and leaf structure would be correlated with transpirational demand. Plant species and varieties would be evaluated with respect to efficiency of water use under conditions of minimum soil moisture. Critical periods of growth, depth of moisture extraction, and foliar absorption of moisture by various plant types would be determined. Efficiency of moisture use as influenced by soil fertility, temperature, and aeration also would be investigated.

BUDGET

RECURRING FUNDS

1. Salaries:	
Director of laboratory (1×$14,000)	$14,000
Associate director of laboratory (1×$12,000)	12,000
Research leaders (3×$12,000)	36,000
Principal scientists (4×$10,500)	42,000
Senior scientists (6×$9,000)	54,000
Associate scientists (8×$7,500)	60,000
Assistant scientists (8×$6,500)	52,000
Trainee scientists (8×$5,500)	44,000
Senior subprofessional (20×$4,500)	90,000
Junior subprofessional (15×$4,000)	60,000
Clerical and skilled labor (15×$3,500)	52,500
Secretarial and unskilled labor (15×$3,200)	48,000
Total salaries	564,500
2. Operating expense (equipment, supplies, maintenance of facilities, utilities, travel, field tests, etc.)	435,500
Total recurring funds	1,000,000

NONRECURRING FUNDS

1. Laboratory and office building: Includes laboratories and equipment for physics, chemistry, soils, plant physiology, microbiology, engineering and statistics; offices for 30 soil scientists plus assistants, constant-temperature rooms; environment chambers with controlled temperature, humidity, and light; soil and plant preparation rooms; chemical and isotope storage rooms; mixing and handling facilities; shop; conference room, etc	$2,000,000
2. Wind, temperature, radiation, and humidity control facility: The facilities must be long enough to obtain a valid model of boundlayer conditions for air movement, and radiation, temperature, and humidity must be controlled and measured rigidly and independently. The test section must be of adequate size for studies involving growing plants in order to measure both evaporational and transpirational losses of soil moisture. A substantial portion of the investment for these facilities will be involved in instrumentation for control and measurement of the climatic elements under conditions of a moving air stream	1,250,000
3. Greenhouses and headhouses	200,000
4. Storage and processing buildings: Provide storage for machinery, vehicles, seed, fertilizers, etc., and processing facilities	150,000
5. Land, including land development	150,000
Total nonrecurring funds	3,750,000

Mr. BECK. I am sure you recognize that in the entire Great Plains area, water is our No. 1 limitation in the production of agricultural products. Though everything known about maximum efficient use of rainfall is practiced by most farmers in the Great Plains, still most of the moisture is wasted by evaporation and by runoff.

Evaporation is by far the most important. Reliable estimates indicate that about 65 percent of the precipitation in the Great Plains is lost by evaporation and about 5 to 10 percent by runoff.

The remaining 25 to 30 percent is transpired through plants. A reduction of evaporation from say, from 65 down to 60 percent would save more than 1 inch of water where the average precipitation is 20 inches.

Projected over the cultivated acreage of western Kansas, say from that 30-inch rainfall line west, we have in there about 15 million acres of land that are cultivated and if we would reduce this evaporated loss by only 5 percent that would amount to 1,250,000 acre-feet of water.

In the other terms, this amounts to about three times the total water stored in Kansas' five major reservoirs today.

This 5 percent reduction in evaporation would produce something in the order of $62 million worth of crops for Kansas, or, if we take the 10 Great Plains States it would amount to about $400 million annually and valuable as water is for crop production, it is even more valuable for industrial and urban use.

We do have some research projects that have indicated to us some degree of success in this direction. We have research, for example, in which we have been able to reduce the loss from evaporation by 5 percent through the use of a paper mulch.

These tests have shown us that the water saved, only this 5 percent saved, has increased our sorghum yields twice, increased the corn yields even more than that.

More recently we have been making efforts to use some of the plastics and we find that they also offer some degree of efficiency in reduction of moisture losses.

These methods, however, are too expensive. We need to go farther, we need to get this into basic research to develop practical methods of evaporation control.

As we look at some of the basic elements involved in this problem, we find that our major concern is the matter of radiation. Sun is the basic source of energy causing evaporation. We have enough solar energy at Manhattan, Kans., for example, to evaporate 92 inches of water in a year; 62 inches from April through September

Not all of the sun's energy is used in evaporation. About 10 to 50 percent of it may be reflected back into the atmosphere.

About 80 percent of that which is not reflected back, however, will evaporate from the soil or plants, where soil moisture is readily available.

Much of the solar energy gets through a relatively dense plant cover to the soil below, measurements taken at Manhattan just at September of this year showed that 45 percent of the solar energy absorbed at surface of the earth penetrated to the soil. The remaining 55 percent was absorbed by sorghum plants in the field study.

Enough solar energy reached the soil surface to evaporate nine-hundredths of an inch of water each day. That equals 2.70 inches a month, or 10.7 inches from June through September.

Since vegetative cover was maximum when these measurements were made, the proportion of energy penetrating plant cover to the soil was much greater earlier in the year.

A way to reduce evaporation and conserve water would be to decrease transpiration from plants. Plants are notoriously inefficient water users. Some of the research, for example, has shown that alfalfa takes just about 835 tons of water to produce 1 ton of alfalfa hay.

We do not know the basic reason why it takes so much water streaming through a plant to bring about plant growth. We feel that there is an opportunity for study in this area in an effort to determine the basic cause of this, the basic needs of the plant for water.

So that we can, once we determine some of these biochemical factors involved, we might then be able to recognize such factors in various plants.

We might, for example, be able to take desert plants we know are more efficient utilizers of water and transfer some of that knowledge into domesticated plants, breeding varieties that would be more efficient.

The CHAIRMAN. Is it not entirely possible that wastage as a result of the absence of some element in that plant protects it from the losses of that water rather than a requirement of that amount of water to produce that plant.

Mr. BECK. It is entirely possible, Senator. It is highly probable the fact that this is a biochemical arrangement within the plant that causes the plant to use water efficiently or inefficiently.

The CHAIRMAN. That is the basis for your thought that studies should be given to the adaptation of desert plants to commercialized livestock feed purposes.

In other words, it might be easier to employ these desert plants for use by livestock, than to adapt, through breeding the ones in use at present.

Mr. BECK. That is a possibility.

Of course, there are many plants throughout the world from which we can draw. Another way, of course, would be to use plants of that kind through breeding work, crossing with domestic varieties to enable us to get additional yields that we have available in our more domesticated varieties.

The CHAIRMAN. I got one indication of the effect of transplanting animal life when I was told sometime back that the pheasant was brought into this country from China and transplanted here only in 1920. If it is possible to bring in an animal that has adapted itself to our area to the extent this thing has, it indicates a possibility of finding a plant to do what you are talking about.

Mr. BECK. That is very true.

Now, in closing this statement, I would guess that we are pursuing research in an effort to learn more about this evaporative loss, not too much is being done in the way of transpiration loss.

It requires a little more in the way of resources and facilities equipment than any one of our experiment stations now have.

The CHAIRMAN. You say that which has been lost by transpiration would be just as valuable as one saved that has been lost from evaporation, would it not?

Mr. BECK. Any saving of moisture would be important.

The CHAIRMAN. A very interesting talk you have given me.

Mr. CHRISTY. We have one of our major farm organizations here that has taken quite an interest in water. It is a general farm organization. They have researched the problem a number of times and I have had the privilege of working with them.

Lou Norris of the Kansas Farm Bureau has a brief presentation and a statement to file.

STATEMENT OF LOU NORRIS, MANHATTAN, KANS., LEGISLATIVE ASSISTANT, KANSAS FARM BUREAU

Mr. NORRIS. Mr. Chairman, Senator Schoeppel, we do have a written statement we would like to file with the committee, and I have a few oral remarks I would like to make.

Senator SCHOEPPEL. The statement may be made a part of the record.

(The statement referred to follows:)

STATEMENT OF THE KANSAS FARM BUREAU

By Lou Norris, legislative assistant

Mr. Chairman, the Kansas Farm Bureau is appreciative of the opportunity to present its views with respect to the development of water resources.

In 1959, there were 73,679 Farm Bureau family memberships in the 105 counties of Kansas. The policies of our organization originate at the county level. Resolutions on issues of State significance become official policy of Kansas Farm Bureau when duly adopted by the voting delegates at our State convention. Those resolutions on issues that are national in scope are recommendations to the American Farm Bureau Federation. Resolutions adopted by the voting delegates from 49 States and Puerto Rico become the official policy of the American Farm Bureau Federation. The Kansas Farm Bureau helps formulate and we support the policies of the American Farm Bureau Federation pertaining to water resource development. The statement we present is within the framework of our adopted policy.

The scope of the study undertaken by this committee seems formidable, and the results may well be of vital importance to the welfare of the entire Nation. Anyone who has made the slightest examination of the water problems of our

Nation can conclude with some accuracy that as early as 1980 the availability of water could be this Nation's No. 1 domestic problem. Reliable projections indicate that the demand for water will double by 1980. Actually, there is nothing frightening in this projection in view of the total supply available, unless we continue to waste our water resources as we have in the past. There is no evidence that this State or Nation intends to do this.

Any projection of the future water needs of this State and Nation deserves the use of the best information available, and the most careful consideration of such information. But accurate projection in a dynamic almost revolutionary society is very difficult. Experience has shown that some methods of calculation have been extremely crude. Especially is this true in agriculture. Changes have occurred so rapidly and drastically in agriculture during the last 20 years that all calculations have been upset. In planning the development of our water resources we cannot afford the margin of error that we have had in our water policy planning for agriculture.

Robert Smith, secretary of the Kansas Water Resources Board has made a significant statement concerning the need for comprehensive water planning. Mr. Smith, writing in the May 1957 University of Kansas Law Review, has said, "A water plan must have many component parts and yet it cannot have any fixed rigid dimensions.

"Such dimensions as it does have must be flexible because the basic water requirements are constantly changing in response to economic and sociological pressures. Nevertheless, such a plan must represent at any given time the best possible appraisal of the physical need and the legal policies necessary to cope with the conditions presented."

We believe that the hearings of this committee will be important in promoting an enlightened national water policy. Especially are we pleased that the committee is seeking testimony concerning water resource development outside of the Federal Government. We know the technical information presented will be important to your work; but we believe one of the most important aspects of these hearings will be the opportunity of members of this committee to learn that the States are cognizant of their water problems, are appraising them realistically, are taking steps to deal effectively with them, and recognize the capacities of the States to develop their water resources. This is not to imply that the States will not need assistance from the Federal Government; but we hope it will become evident that only assistance is needed, and not Federal domination of our water resources development activities.

The activities of this State in the field of water resources date back more than 40 years. The basic Kansas water law was passed in 1917. Up until 1950 much of the emphasis had been on the collection of data and administration of the various regulatory laws. However, since 1955 there has been increased activity at the State level in planning for future development.

In 1955, the legislature created the State board of water resources, a giant step in developing a continuing program of planning for future development of our water resources. The Kansas Water Resources Board is charged by statute with the responsibility of developing a "State plan of water resource development for each watershed in the State." It is the objective of this board to develop a sound guide for the future use, management, and development of the water resources of the State, which will be in the best interest of its citizens and consistent with State and national policies.

Much of the technical data and projections of the quantity and quality of water needed in this State will be found in State water plan studies made to date by the Kansas Water Resources Board. I am sure that copies of these studies will be made available to your committee.

In 1944, when Senator Schoeppel was Governor of Kansas, an advisory committee was appointed by the Governor to study water problems in Kansas. A specific problem cited by this committee was that if individuals, industries, and Government entities were to make investments in water resource development, they would demand and need assurance that they would have a valid right to use the water for the present and the future.

Undoubtedly, recognition of this requirement was a motivating factor in the enactment of the 1945 Kansas Water Appropriation Act. Substantial clarifying and strengthening amendments were made to this act in 1957. It should be pointed out that the Kansas appropriation law recognizes both ground and surface water.

In the last general election the citizens of this State indicated their willingness to assume a greater financial responsibility in the field of water resource development when they amended a 100-year-old provision in the State constitution

that prohibited the State from engaging in works of internal improvement pertaining to water.

ROLE OF THE FEDERAL GOVERNMENT

As we have already stated, the States will need the assistance of the Federal Government in the development of their water resources. Federal leadership is sound in principle, but this is not to say that Federal domination of water resource development is desirable. It does not follow that because there is a strong national interest in the development of our water resources that there likewise should be Federal administration.

In the last 25 years the Federal Government in vigorous support of its reclamation, navigation improvement, power, and flood control programs has asserted increasingly greater powers over all kinds of water resources.

For the past 100 years these various Federal programs have been separately conceived and separately administered, and often have been shaped by crises and circumstances, by pressures and politics, rather than by reason and intellect. Some of the Federal agencies become so absorbed in building bigger and better dams, that they lose sight of the interest of the people to be served.

The Hoover Commission Task Force On Natural Resources turned up voluminous data bearing out the fact that both the Bureau of Reclamation and the Corps of Army Engineers habitually built projects without sufficient or accurate justifying hydrologic data. "So serious are these deficiencies that it is estimated on the basis of experience that the limit of error or ignorance in present water development is rarely less than 25 percent and is frequently greater than that," said the report. The Hoover Commission concluded there is no effective agency for screening and reviewing proposed projects to determine their economic and social worth.

The trend in construction of reservoirs in the United States is still steeply upward, but as observed in Engineering News Record (1958), the point of ultimate development for hydroelectric power, irrigation, flood control, and navigation may be seen on the horizon. Water supply and pollution abatement may become the dominant objectives of water storage.[1]

The changing emphasis in water resource development was apparent at the Tuttle Creek Dam dedication last July 4 in the remarks of the representative of the Corps of U.S. Army Engineers. For nearly 20 years the merits of the Tuttle Creek project had been debated furiously in terms of flood control. This project was generally recognized as a flood control project. But the remarks of the official representative of the Corps of Engineers at the July 4 ceremony implied quite plainly that ultimate justification of Tuttle Creek Dam would depend on its usefulness for the purposes of water supply and pollution abatement.

Although in the East a considerable increase in usable water supply can be obtained by additional reservoir storage, some drainage basins in the West may already be approaching the limit.[1] The Colorado River Basin is an example of a river where storage developments may be approaching, if not exceeding, the useful limit.[1] Thus there is a real challenge in achieving efficient location of the added storage to meet water supply needs.

WATERSHED PROGRAM

We do not feel that sufficient attention has been given to the water supply features of the watershed program. To date much of the watershed planning has emphasized the conservation and flood control benefits. The drouth of 1954 and 1955 brought some realization of the need for more attention to the water supply aspects of the watershed program.

The watershed program has not developed rapidly in this State, although there is now renewed activity. There have been many bottlenecks. The cost-price squeeze which has hit the farm economy so hard has made it impossible for farmers to do all they would like to do with the watershed program.

Our organization does have faith in the watershed program. The voting delegates at our State convention in Wichita, November 11, 1959, adopted the following resolution:

"We reaffirm our faith in watershed programs as being essential for the best development of the economic resources of our State. We realize that some of the watershed movements have encountered difficulty for various reasons, such as lack of understanding, the responsibility of benefit areas, shortage of planning

[1] "Water Guide and Reservoir Storage in the United States," Geological Survey Circular 400.

personnel, problems concerning easements, and others. But we are convinced that farmers of Kansas will accept this program when there is thorough understanding of the responsibilities involved and full appreciation of the benefits to be gained. This program is one which must have time to develop on a sound basis. For that reason we will oppose new authorizations for dams to be built by the Corps of Army Engineers or the reclamation service where such authorizations reduce or invade the benefit area of watershed organizations which have a reasonable opportunity to succeed. We would point out that new authorizations for the Corps of Engineers are not urgent since the Corps now has sufficient authorizations to occupy its energies for some years to come."

FEDERAL-STATE RELATIONS IN WATER RIGHTS

One of the most frustrating problems, which is a serious deterrent to the water-resource development of this Nation, is the uncertainty as to the status of State water rights. This uncertainty has arisen out of a number of Federal court decisions and allegations made by the Justice Department of the Federal Government. The members of this committee are familiar with these cases and the contentions of the Justice Department, and we know that the members of this committee recognize the importance of this problem to the work of this committee.

Senator McGee, of Wyoming, who is a member of this committee, has pointed this out. In a statement before the House Subcommittee on Irrigation and Reclamation, Senator McGee said, "In recent months the Senate Select Committee on National Water Resources, upon which I serve, has begun a comprehensive study of projected water-resource development to be accomplished by 1980, the date set by Senator Mansfield, the author of Senate Resolution 48. * * * It has become obvious, even in our early studies, that one of the problems which most complicates the orderly development of the use of water, not only in the West but the entire Nation, is the fact that there is an uncertain division of constitutional and statutory authority in this field between the Federal Government and the various State governments."

This question is the most fundamental of all the questions to be answered by this committee. And leaving it unresolved will prolong uncertainty in effective planning at a time when positive action is needed urgently, and will lead to the ultimate federalization of all our water resources.

There does not exist a Federal body of law under which water rights for consumptive uses can be determined. Traditionally, the States have had this responsibility, and we contend this is as it should be. But it is imperative that Congress set forth in clear, concise language that a plain man can understand, that any water right acquired under State law is a valid property right and cannot be taken away without compensation to the holder.

The so-called *Pelton Dam* case in itself is relatively innocuous because apparently the rights of no consumptive user were affected; but when the case is carried to its logical conclusion the economic consequences are serious. The *Pelton* case implies that the Federal Government has some sort of a mysterious right to all the water flowing through or upon reserved lands, and that such right is not subject to State water law. Since most of the reserved Federal lands were withdrawn about 1910, practically every water right granted in the Western States since 1910 is clouded, and water users may discover that what they have is no right at all. It is difficult to imagine any public interest great enough to justify such a development.

We urge the members of this committee to support legislation that will grant authority to State governments to control the water flowing through or upon so-called reserve lands of the Federal Government, and to provide that the rights to use this water can only be perfected under the water laws of the States. Not only should such legislation be applicable to surface water, but to ground water underlying Federal reserved lands as well. While the *Pelton* case may have only a very limited present application in Kansas because Kansas is not a reserved land State, it is establishing an undesirable precedent so far as the other Western States are concerned that could lead to chaos.

Of concern to the people of this State is the right of the State of Kansas to appropriate the water of navigable streams for consumptive and nonconsumptive users.

We recognize the supreme constitutional authority of the Federal Government to exercise complete control over the waters of the United States that are

navigable. But Federal courts have handed down decisions which might extend this authority to the upper reaches of every watershed in the United States by a broad, new definition of the term, "navigable waters." Whatever may be the ultimate power of the Federal Government over all water resources, there is no constitutional mandate for Congress to exercise any power other than control of navigation; and there is no constitutional prohibition against relinquishing the power to control the consumptive uses of the waters of navigable streams to the States.

We believe it is desirable for the fullest development of our water resources that Congress establish as a matter of national policy that the rights of States to control the consumptive uses of water from navigable streams is unrestricted unless cut off by Federal legislation. When Federal legislation does preempt the stream in the interest of navigation, anyone who loses a right granted by State authority should be compensated. We believe there is a strong moral obligation for the Federal Government to make all State water rights compensable, and there should be no distinction between navigable and nonnavigable streams.

So long as the status of water rights granted by the States depends on court interpretations of the term, "navigable waters," there will be confusion and litigation. But Congress can establish a clear principle in law that consumptive water use rights granted by States on navigable or nonnavigable streams are compensable. To give such rights the full status of property rights, we believe it would be desirable to delete the exclusion in subsection (c) of section 208 of the McCarran Act of July 10, 1952; thus giving general application to the consent provision to waive Federal Government immunity from a lawsuit in water litigation.

WEATHER MODIFICATION

We would like to make some mention of weather modification though we have no adopted policy on the issue.

During the drought of 1952 to 1957, we saw an increased interest, especially in northeast Kansas in "cloud-seeding." Weather practitioners moved into this area to contract to carry on cloud-seeding operations.

Our office received numerous requests for information concerning the success of these programs. We could find very little factual information on the subject, and what was written was of a highly technical nature.

While it is probably desirable to continue research in this field, we believe it is desirable that the results of these experiments be publicized.

We understand that present methods of cloud-seeding are purely experimental and offer little hope for success over the Great Plains area.

CONCLUSIONS

So far as the State of Kansas is concerned, an accurate survey of water resources and realistic planning for most efficient development of these resources is absolutely necessary. We know that the future growth of our State is tied directly to the available supply of water. This problem of a firm water supply is compounded in Kansas because of wide cyclic fluctuations in precipitation. Inadequate precipitation in one year and excess amounts in other years present special problems for agriculture in this State.

In a factfinding report published in 1954 entitled, "Water in Kansas," it was estimated that for each inch by which annual precipitation fell below normal, there was a reduction of $20 million in the annual cash farm receipts. In a survey conducted among Kansas agricultural agents it was estimated that in 1956 Kansas spent $10 million in hauling water to farms and ranches of the State. Such estimates, of course, do not include devastating losses from floods in wet years.

No segment of the Kansas economy has a greater stake in water resource development than the farm and ranch families. Nothing is more certain in this State than the uncertainty of the natural water supply from year to year. Since there is no way of increasing natural precipitation in years of deficiency, the major problem is making the best use of what we have.

In the past 10 years there has been phenomenal expansion of irrigation in Kansas. Irrigated acreage has increased from 96,000 acres in 1945 to about 900,000 in 1959. Almost two-thirds of this acreage is located in southwest Kansas where the supply comes from ground sources. It is imperative that we know more about the ground water in this area, both as to quantity and quality. In some irrigated areas there is some reason to believe that water is being with-

drawn from ground water sources at a rate many times the rate of natural recharge. Accurate information is needed in such areas so that development can be orderly and based on firm expectations. There is an urgent need for applied research on methods to reduce losses from transpiration and evaporation.

The problems of water supply should give new impetus to watershed programs as a means of developing supplies for agricultural needs. Among the varied programs of water development, the watershed program has not been given the status it must have to serve the agricultural needs of this State. Wherever a watershed program has a reasonable chance to succeed, programs of Federal agencies should not be allowed to impair such a chance by being permitted to usurp benefits to which the watershed plan has a justifiable claim, and which may be needed to make the watershed project feasible.

There is evidence that construction of large reservoirs in this Nation is nearing the point of diminishing returns. In some areas, reservoirs whose feasibility rested largely on flood control have flooded more land than they were built to protect. Now that there is increasing recognition that firm water supply may be a consideration as important as flood control, the Corps of Engineers has proposed a number of projects which have very doubtful feasibility in terms of supply. In some areas where a watershed project and a corps project may be contesting for priority, we believe there is need for scientific study to determine whether one single reservoir, or the diversified program of a watershed project will best meet the water supply needs of community development.

This is not an issue which should be settled in the political arena. It is time to develop an objective and scientific policy of water development to meet the supply needs of the future. Kansas agriculture is accustomed to many uncertainties; but uncertainties of public water policy should be eliminated. This committee can be a decisive factor in helping to shape firm water policy in which the role of various levels of government is clear. It is our firm belief that the major role of the Federal Government is in the field of research, so that each individual policy decision may be based on the best information available.

Mr. NORRIS. I first would like to say that the president of the Kansas Farm Bureau wishes to convey his regrets he was unable to be here to present his statement to this committee.

Senator SCHOEPPEL. We appreciate it that he sent you folks here.

Mr. NORRIS. Our organization has been identified as the general farm organization. We have some 74,000 farm families which compose our membership in Kansas.

I would like to say that as an organization we concur in the statements that have been made here by Mr. Christy and Dr. Beck.

I cannot enlarge upon the technical aspects of their testimony.

We know that the answers to the questions that are in the mind of the committee members are not forthcoming. We would like to make this one reminder that whenever we try to project our thoughts into the future as to the needs of our society, generally when we reach the point of our projection we find that our calculations have been extremely crude.

I think agriculture is a good example of this. I think we can relate many of the major problems in agriculture today to the results of some extremely poor planning.

I would like to say that I don't believe we will be allowed the margin of error in planning for the future of our water resources as we made in planning for agriculture.

I don't want to be repetitious. I would like to say a little bit about Federal development in water resources.

Historically I think the Federal Government concern has been mainly with flood control, drainage, hydroelectric power, navigation, and so forth.

All through the debates we heard very little said about the water supply and pollution abatement.

I cannot help but remember the speech that was given at the dedication of Tuttle Creek Reservoir. As you know that has been somewhat controversial in this State, the establishment of it. All the debates that went on were over the flood control aspects of the reservoir.

The spokesman for the Corps of Army Engineers at the dedication of that site pointed out that the feasibility of that huge reservoir some day would be proven because of its water storage capacity, and not too much has been mentioned about the flood control aspect of the reservoir.

I think in time it may be proven that we have been extremely shortsighted in overambitious development of dams and reservoirs. I say this because I think what Bob Smith has said, that in many cases the water storage aspect of these sites has been overlooked and has not been developed to its fullest extent.

There is one point I would like to expand on just briefly and I know that you gentlemen will recall, through the hearings that you held in the other States, that this point has been made. That is the uncertainty of water rights.

Probably the most notorious case is that so-called Pelton Dam situation. As I read this case, I cannot be too alarmed about Kansas because we are not a reserved land State as you know. But I do believe it has created enough uncertainty that one of the most fundamental things that needs to be done is to clear up this doubt that exists on the validity of State water rights.

I do hope that in the 2d session of the 86th Congress that we can have legislation that will clear this problem up.

In concluding, I would like to say this: That there is no group in this State that has as big a stake in the water resources development as does agriculture. No group suffers more from the caprices of Mother Nature than the farmer.

Our water resources board has reported in a report on water in Kansas which was made available in 1955 that for each inch of deficiency statewide in precipitation——

The CHAIRMAN. Each inch?

Mr. NORRIS. Each inch of deficiency in the precipitation—maybe I didn't say it very well.

The CHAIRMAN. I am trying to get what you did say. I understood it if I can hear it.

Mr. NORRIS. Let me try to restate it.

For each inch that we are deficient in rainfall below the average it causes a $20 million reduction in farm receipts.

The CHAIRMAN. In other words, for each additional inch that you could have over and above what you have now you would increase your farm production $20 million?

Mr. NORRIS. No, that isn't the way I understand the statement.

Each inch we are deficient above a certain point.

The CHAIRMAN. What point?

Mr. NORRIS. The average rainfall.

The CHAIRMAN. The average rainfall is what?

Mr. NORRIS. The average in Kansas, which is somewhere around 27 inches——

The CHAIRMAN. Then would it not be correct to say that for each additional inch of average rainfall you could receive that your production would increase $20 million?

Mr. NORRIS. I don't think that would be true. In years of drought, yes, it would be true, but in years when we have plenty of rainfall sometimes it would have the adverse effect.

Additional inches may cause a decrease in farm income.

The CHAIRMAN. Then for each additional inch you could get in those years when the total is below the annual average, and up to the point where it would equal annual average, that would be true?

Mr. NORRIS. Yes, sir; I think that I would agree with that; yes.

The CHAIRMAN. I am not trying to argue with you. I am trying to understand you.

Mr. NORRIS. I am glad you have the fact clear. Thank you.

An additional survey made by the water resources board reported that 1956, the farmers of this State spent more than $10 million hauling water to their farms and ranches. That survey was conducted by the county agents in the various counties. That is a sizable chunk of money.

The CHAIRMAN. I will make a statement that will give you a picture of the same kind in Oklahoma.

During that year three-fourths of the urban population of Oklahoma rationed water at one time or another.

I would not be surprised that that was true in Kansas.

That was true of our areas, yes.

Mr. NORRIS. We had some.

The CHAIRMAN. In the urban areas?

Mr. NORRIS. We did have. So far as water supply problems of the farmers concerned, the reservoir approach offers only limited relief. We do think so far as the water supply problem for domestic use, and livestock use that the watershed program does have some merit in this respect.

Finally, I would like to say this: So far as agriculture is concerned in this State, and I think it is borne out with what Dr. Beck and Mr. Christy said, that the most relief we can expect will come in the field of research.

I am particularly attracted by the aspects of research in reducing evaporation transpiration requirements.

Again I would like to quote a figure that the water resources board has furnished me. They state this:

That if we can reduce the evaporation transpiration requirements 1 percent it will increase the supply available for other uses by as much as 10 percent.

In the Great Plains area which is a great agricultural area of this State, I think that this is extremely important, that we carry on this type of research because it is the only place where I see that that area where we can increase the supply, we know the ground water is limited; we don't know too much about it.

We wish to know more about it from both the quality and quantity standpoint.

I would like to say just something about weather modification. During the drought years that we experienced just a few years back we saw practitioners move into this State professing to make rain. If I can be facetious for a moment, it was like the fellows I was quail hunting with last Saturday. They claimed everything that fell.

In this respect I think they can do more about long-range forecasting. It seems to me that about the best long-range forecasts that the farmer has to go by are still found in the Farmers Almanac.

Then it does seem to me the scientific advancement that has been made that there should be more reliable long-range forecasts.

The CHAIRMAN. Those farm almanacs are published annually, are they not?

Mr. NORRIS. Yes, sir.

The CHAIRMAN. And are these almanacs published in 1960—are they published on the basis of 1900 information, or do they have access to whatever up-to-date information there is available?

Mr. NORRIS. I was being facetious.

The CHAIRMAN. I am too.

Mr. NORRIS. What I meant to say was their forecasts seem to be about as reliable as some we get from the Weather Bureau report.

The CHAIRMAN. I am not representing the Weather Bureau, but I do want to say this:

They are doing the best they can. I really think they are doing a terrific job. They cannot control the weather. They can only make the best estimate that they are able to make on the basis of what they can learn as to approaching changes in weather conditions and the effects of them.

I want to say this for them: they, too, have been before the Congress with what I thought was a very worthy effort to obtain the wherewithal to increase their research. I would beseech your understanding of their problems as well as you have the awareness of other problems.

Mr. NORRIS. Thank you. We would appreciate research in that direction and we think that there are some things that can be accomplished.

And that concludes my remarks, Senator.

Senator SCHOEPPEL. Thank you for your presentation.

Mr. CHRISTY. Next of the group that I would like to present to you, gentlemen, is Dr. Charles Richard, a director emeritus of public relations department of the Kansas Farmers' Union.

Dr. Richard.

STATEMENT OF CHARLES A. RICHARD, TOPEKA, KANS., DIRECTOR, PUBLIC RELATIONS, KANSAS FARMERS UNION

Mr. RICHARD. Senator Kerr, Senator Schoeppel, I bring greetings of Barton Bonn, president of the Farmers Union, who is in Manhattan preparing for a State convention and could not be here today. But he expresses a great deal of interest in the hearing.

I want to read this brief statement and it will be entered in full in your record.

Kansans, just like all Americans, are deeply interested in the conservation of our natural resources.

This statement has to do very largely with the conservation, use, and control of our water resources. Agriculture is dependent directly upon the proper amount and control of water. Our family farms, as well as larger units, must seek to use every means to achieve this end.

This problem becomes all the greater in the light of the enormous use of water industrially, domestically, and agriculturally.

The Presidential Advisory Committee on Water Resources Policy states that by 1975 Americans will need and use 90 percent more water than they used in 1950.

The problem is too great for the farmer on the land to handle. It is a national matter of first importance.

Because of this, government, both Federal and State, must be called into the picture. This has been done in the very first degree, but there are certain aspects that need to be emphasized.

There are three major areas, as we understand it, in which the Government has undertaken to lend help.

We desire to state these in the order of their timing, following the brief discussion of these we will present two or three suggestions.

First, let us mention the soil and water conservation on the farms of Kansas.

This includes proper land use, protecting the land against all forms of soil damage, conserving moisture for crop use, reducing floor sediment damage, improving the quality and regularity of water yields, installing proper methods of drainage and irrigation.

We will not take time to go into the techniques used.

Into this picture the Federal Government entered in 1935 and Congress enacted the first broad national conservation act adopted by our country, and it is claimed the first in any country.

State legislatures in 21 States in 1937 enacted soil conservation district laws. By 1947 other States had done so and also Alaska, Hawaii, Puerto Rico, and the Virgin Islands.

The reason we stress this first is that it is of primary importance in the total picture of water conservation and flood control that the land where the rain falls must be the first place to attack the problem by the building of ponds and use of many other practices, this is a big step in the total control picture.

The second phase is the watershed program. This became necessary because, when set in motion, State water can help swell a flood in the lower areas.

Waters in the upstream areas cannot be said to be controlled, however, if they are managed to avoid damage in one area, but become excess in lower areas of a watershed.

Public Law 566 set up the Watershed Protection and Flood Prevention Act of 1954, under which the Federal Government pays full costs of construction of flood prevention works and up to 45 percent for drainage programs.

This is a most important second step. This law recognizes a very important principle. In the watershed district at least 50 percent of the owners of land in the district must agree to meet the conservation needs of their own farm, and at least 75 percent of these must have begun their program before the watershed is established.

This means that the first step in any conservation program must begin on the land itself.

The Kansas Farmers Union recognizes this as the second distinct phase of our overall water conservation and control program. It believes that quite generally these two must be met before the third can be efficiently effective.

The third phase is the erection of the big dams, and other major river projects in areas of high population and potential productivity of land.

The 1954 act of Congress, as amended by Public Law 1018, authorized the Corps of Engineers of the Army be directed primarily toward these flood control programs.

Under this program advance, of course, has been steady. With this as a background the Kansas Farmers Union desires to make some brief statements.

First, we believe in the total program of our State and national system of water conservation, control, and use.

We believe, however, that the above order gives the frame of reference. It is most important that we stress the primary need of controlling the runoff on the upper levels and hold back as much of the moisture as possible.

To supplement this we believe the second step is that of the watersheds with the wider areas of their districts.

This is, so to speak, the second level.

Then, after these two have been fairly well cared for, locate the large dams and develop other major river projects in strategic places.

It is poor economy to build dams when no provision has been made to control the runoff water which washes great volumes of soil as sediment down against the dammed up water.

We would like to make a further assertion as to the totality of our water control program, and that is, the drainage, flood control, and water conservation are all interrelated.

We might further say that tied into this interrelation also is that of soil conservation, that our soil cannot find its way down as sediment blocking the attempt at flood control and further depleting our soils.

May we be permitted to make a suggestion or two?

First, we do believe there should be the closest coordination of all agencies working upon this problem. This alludes to the Federal and State agencies and clear back to the tillers of the soil.

We have already indicated the utmost need of coordination of upstream and downstream work for present and future programs.

Furthermore, as we understand it, the Federal Government pays for all flood control measures, but other parts of the program of the watershed are paid for in part by owners of the land.

This discrimination sometimes leads to the neglect of many worthy and serviceable features of the program. For it is a temptation for a community to stress that part for which the Government underwrites the whole financial cost. There needs to be some adjustment and study at this point.

We believe that before any upstream or downstream project is to be inaugurated that there should be a most thorough survey of the total picture beginning with the water conservation of the farms, the watershed, and finally, the big dam construction.

It is all one picture, and if thrown out of balance some will suffer and the end results will be far from satisfactory.

Furthermore, there should be well understood relative costs to be shared by local State, and Federal agencies.

Our final word is that this matter of water conservation and use is of so great national importance that our Government should tie together all the present piecemeal programs into one national water resources picture.

Senator SCHOEPPEL. Thank you, Mr. Richard.

Mr. CHRISTY. The next man that we have on the list to be heard is Mr. Germann. He is the chairman of the Soil and Water Conservation Department of the Kansas Livestock Association.

Mr. Germann.

STATEMENT OF FRED GERMANN, DWIGHT, KANS., CHAIRMAN, WATER RESOURCES COMMITTEE, KANSAS LIVESTOCK ASSOCIATION

Mr. GERMANN. Senators Kerr and Schoeppel, the Kansas Livestock people, just like other citizens, are becoming increasingly aware of the vital importance of water toward our future development.

I have a statement here which I would like to file with you and I will make a very brief résumé of that here.

Senator SCHOEPPEL. It will be a part of the record.

(The statement referred to follows:)

STATEMENT BY THE KANSAS LIVESTOCK ASSOCIATION, FRED GERMANN, CHAIRMAN

The Kansas Livestock Association commends the U.S. Senate for organizing a committee to make a study of the Nation's future water needs.

Livestock men of Kansas as well as most citizens are becoming increasingly aware of the vital importance of water to our development.

We feel that the upstream water program deserves much more consideration than it is now receiving. Let me cite the Kaw Basin as an example of what we refer to. All the main tributaries of the Kaw now either have large dams authorized, under construction, or built near their mouths. Upstream from these structures lies some 85 percent of the total land area of the basin comprising an estimated 50,674 square miles or 32,431,360 acres. There are several structures farther up these streams providing some irrigation water and flood protection. However, the vast majority of this great watershed is without flood protection except what has been developed through land treatment.

Flood losses upstream are much less dramatic as a rule than the occasional devastating downstream overflows, but studies indicate total losses are considerably greater over the years in the upstream areas where floods begin. It is in these vast upper reaches, not only in the Kaw but other Kansas river basins that a great majority of our agriculture and particularly livestock is produced.

Congress took a step toward assisting those areas adaptable to upstream flood retardation programs with the enactment of the Hope-Aiken Act in 1954.

This act has met with great interest in Kansas. In fact the engineering assistance in planning watersheds has fallen far behind the demand. The watershed of which I am a resident was approved over 18 months ago and there is no help in sight. We are told that it would take 3 years with the present planning personnel to engineer the watershed districts now approved. This number has been snowballing rapidly. Therefore we feel it is imperative to the Hope-Aiken program that larger allocations be made available to get this technical aspect of the program rolling. It is not necessarily a matter of training new help because there are capable private engineering firms available to assist the Soil Conservation Service.

Because of the requirements that 75 percent of the land treatment be completed above detention damsites before they are built, as well as the increased educational features and interest prevalent in watershed development, the Soil Conservation Service personnel are faced with a huge backlog of farm planning. They are in great need of funds to provide personnel to do this job.

As in most programs of such recent enactment there is much understanding yet to be gained before the movement reaches full stride.

It appears obvious that the present rate of appropriations for construction are grossly inadequate to get the job done in the foreseeable future. Studies by the Soil Conservation Service published by the Kansas Water Resources Board in June 1959, indicate that in the northeast portion of Kansas which drains into the Kaw from the Big Blue area east, there are approximately 850 potential sites for flood water retarding structures of the type provided for in the Hope-Aiken Act. The estimated cost of these structures is around $50 mil-

lion. Comparing the potential development of this one small part of the Nation with the 1959 appropriation of $25 million for the program over the entire United States, obviously it will not begin to meet the needs.

During the severe and widespread drouth of the mid-1950's, millions of dollars were spent annually to haul water to rural people and livestock, to say nothing of the numerous towns who were in dire straits. It will be largely up to individuals in many cases to develop these needs on their farms. However, considering the widespread potential for storing excess floodwater for irrigation, water supply or other local use in floodwater detention dams, consideration should be given to making the cost sharing for this storage more attractive to those in the watersheds to encourage development of a larger portion of the potential supply.

There are a number of places in Kansas, particularly on creeks in the Kaw Basin where there is a conflict relative to whether a program of constructing large dams near the mouth, or an upstream program of smaller structures, along with the land treatment of the watershed, should be developed.

The Kansas Livestock Association has taken the stand that where local people are trying to develop their water resources under the Hope-Aiken Act, no large reservoir should be authorized to limit their flood plain benefit area. On the creeks if a large dam is built near the mouth, it is then virtually impossible to justify the upstream program. However, if the upstream work is developed, the dawnstream site would still be available and well protected from siltation if the time comes that it is imperative to develop it for further water supply.

SOIL AND WATER CONSERVATION COMMITTEE

POLICY STATEMENT

(This policy approved by the Kansas Livestock Association Board of Directors and all others attending the 46th annual convention March 12, 13, and 14 in Wichita.)

Whereas the livestock industry is one of great importance to our State; and

Whereas at times there occur periods of severe drouth due to which it becomes necessary for livestock producers to reduce or dispose of their herds because of feed and water shortage; this all has a disastrous effect upon the financial stability of the livestock industry; and

Whereas in years of excessive rainfall, the water runoff is usually very heavy and such loss of water takes with it a vast amount of precious topsoil, unless steps are taken to reduce such losses, it is readily apparent that Kansas at such times is losing not only its most valuable soil, but also a great deal of water which should be stored where it falls; and

Whereas your committee wishes all Kansas people an awareness of the tremendous importance of preserving our rich heritage of natural resources; it

Therefore, recommends a soil and water conservation program so engineered that the soil itself, which after all is nature's greatest water reservoir in our State, may be utilized to its maximum capacity for the storage of rainfall in Kansas.

Your committee further recommends all practical practices for retaining as much as possible of our annual precipitation on the land where it falls, be employed.

Your committee further recommends that since it is a matter of public concern that taxation is becoming an alarming item of expense each year and since it is also a matter of common knowledge that farm and livestock operating costs are dangerously high, that in order to safeguard the financial stability of our vast livestock and farming industry, it is of the utmost importance that an up-to-date soil and water conservation program employing the most efficient practices be put into operation on a statewide basis with as little delay as possible.

Your committee further recommends that laws governing such practices be made as simple and practical as possible and that so-called redtape be reduced to a minimum.

Mr. GERMANN. The Kansas Livestock Producers are particularly involved in upstream watershed development.

Such as provided for in the Hope-Aiken Act, Public Law 566, wherever it is applicable.

I call your attention to the fact that over 80 percent of the Kaw Basin is above main stem authorized reservoirs. Certainly these reservoirs cannot be expected to provide flood protection and water supply for the vast upper reaches of the river basins whether major or portions of our agriculture, and particularly if livestock is produced.

Therefore, we are particularly appreciative of Public Law 566 which was enacted a few years ago to help fill this need.

To carry out the provisions of this act we feel that it is going to require more technical assistance than we are now receiving as many watersheds are waiting and have been waiting, and appear to have to wait for some time to get the technical assistance that is needed.

Now, is the time it would seem to restudy the cost-sharing provisions between the Federal Government and local interest for storing excess water in detention dams for later local use, such as for irrigation and for water supply for towns or livestock.

Many of these structures can provide a substantial supply of water, if a formula can be worked out which will encourage greater development of this potential aspect of the watershed program.

There are several places in Kansas, particularly on creeks in the Kaw Basin where there is a conflict relative to whether a program of constructing large dams near the mouth or upstream program of smaller structures along with the land development of the watershed should be developed.

The Kansas Livestock Association has taken the stand where local people are trying to develop their water resources under the Public Law 566, no large reservoirs should be authorized on these creeks and to limit the flood plan benefit areas.

On the creeks of the large dams built near the mouth it is then virtually impossible to justify the upstream program.

However, the upstream work is developed, the downstream site will still be available and well protected from siltation if the time comes when it is necessary to develop it for a further water supply.

Thank you. That is all.

Mr. CHRISTY. We have one more witness to be presented, Senator, and that is Dr. Wooster, our executive secretary of the West Kansas Development Association, president emeritus of the Kansas State College at Hays, and a former colleague of mine on the water resources board.

Dr. Wooster.

STATEMENT OF L. D. WOOSTER, HAYS, KANS., EXECUTIVE SECRETARY, WESTERN KANSAS DEVELOPMENT ASSOCIATION; PRESIDENT EMERITUS, FORT HAYS STATE COLLEGE

Mr. WOOSTER. Senator Kerr and Senator Schoeppel. Twenty-five copies of this report have been placed in the hands of the gentlemen over there at the table.

I shall only mention about two items. This is a study of the water supplies of the great plains region of which western Kansas is a part.

(The report referred to follows:)

STATEMENT BY THE WESTERN KANSAS DEVELOPMENT ASSOCIATION

PROBLEMS OF WATER SUPPLY ON THE GREAT PLAINS

This is a statement prepared by the Western Kansas Development Association on the status of water supplies in the region known as the Great Plains and accompanied by a copy of the October-November West Kansan containing important statistical and explanatory materials.

The Great Plains region, as more or less technically described, is a strip of land running north and south across the United States just west of the 98th meridian and extending from Montana on the north to Texas on the south, and including western Kansas. (See map at the top of page 1 of the October–November West Kansan).

I. What are the characteristics of the Great Plains as defined by authorities? They are three, as follows:

1. Relatively plane topography;
2. Deficient rainfall;
3. Treeless, except along streams.

For present purposes we are concerned particularly with No. 2, namely, deficient rainfall, that is, precipitation of all kinds.

What is the precipitation (rainfall, snowfall, etc.) on the Great Plains and to what extent is it deficient?

John A. Widtsoe, in Dry Farming, page 24 has divided average annual rainfall into the following categories:

Less than 10 inches: arid (desert)
From 10 to 20 inches: semiarid
From 20 to 30 inches: subhumid
Above 30 inches: humid

The precipitation on the Great Plains runs all the way from subhumid, as defined above, to arid (desert). In western Kansas, for example, the longtime, annual, average precipitation runs from subhumid to semiarid, and, on occasion, to arid, on the one hand, and to humid and floods, on the other. (See map of Kansas with average rainfall by counties, at the bottom of page 1 in the accompanying West Kansan.) Of course there are variations in precipitation from month to month, from year to year, an by periods as shown on the precipitation record and cycle-pattern chart printed on page 2 of the accompanying West Kansan. For example, in the period from 1946 to 1951, inclusive, the precipitation over the Middle West was well above average and there were major floods. Then immediately following was a 5½-year period considerably below average, ending in the year 1956 with less than 10 inches of precipitation in the western third of Kansas—in other words, arid or desert. The chart on page 3 of the West Kansan illustrates how moisture fall even within a period of little less than 2 years can vary considerably.

II. The deficiency of moisture on the Great Plains gives us a clue to the water problems of the area. Of course, stated in broad terms, it is a problem of holding all the rain that falls, storing it and using it efficiently.

Dr. Karl F. Kraenzel, professor of agricultural economics in Montana State College, and an authority on the economics of the Great Plains, has stated that the only salvation for agriculture on the Great Plains is irrigation. Of course before there can be irrigation there must be plentiful water supplies in one form of storage or another. So the problems involved and their various solutions center around the capturing, retention, storage, conservation, and use of the water which does fall.

Conservation and proper preparation of the soil, the development of watersheds, the construction of great reservoirs, the building of farm ponds, the recharging of underground water reservoirs—all these are among the ways and means of building up backlogs of water supplies for use as needed. And the Federal Government through its various agencies has helped and is helping to build up these various facilities for the conservation of water. Without this Federal help we would revert back to the state of affairs of 50 years ago. Much has been done to make the desert—not exactly "blossom as the rose," but certainly

to greatly improve the growing conditions on the Great Plains. Of course much more can be done in the future. (See No. III, which follows, for suggestions for future development.)

III. As a help to future planning and protection against surplus precipitation and major floods, on the one hand, and periods of drouth on the other hand, the Western Kansas Development Association research department has studied the precipitation records in Kansas and has found that there is a regular cycle of about 22 years, in which there is a 5½-year wet period with major floods over the nation, a 5½-year drouth period and an 11-year, or thereabouts, so-called mixed period in which there is an unpredictable mixture of wet and dry spells.

A study of the cycle pattern chart on page 2 of the accompanying West Kansan will show this to be true. This has been true for as long as records have been kept. And what does this mean to farmers, municipalities, and State and Federal action? Simply this, that knowing for years ahead when these different kinds of periods will occur, appropriate planning, preparation and construction can be done far enough ahead to alleviate conditions of too much water or too little, and to build up great storage supplies in times of plenty to alleviate deficiencies in times of drought.

For example, according to this cycle pattern chart, we can expect the next 5½ superwet period to begin in about 1968, depending somewhat on the variable length of the mixed period in which we are now; and the next drought period would start in about 1973 and last 5½ years. We should be planning accordingly.

The Western Kansas Development Association is glad to present this material for whatever of value it may be for future progress in dealing with the moisture deficiencies of the Great Plains of North America.

LOSSES OF WATER

Approximately four-fifths of the rainfall which falls is lost by evaporation and runoff.

To illustrate, we herewith print an estimate of what becomes of the average, annual precipitation of 23 inches in Ellis County, Kans., as prepared by soils men of the region.

	Inches
1. Lost in ineffective showers—too light to do any good—evaporates	7.1
2. Lost by evaporation during tillage	.5
3. Lost by evaporation from good showers	8.1
4. Lost by runoff	3.0
5. Left available for vegetation	4.4
Total	23.0

NOTE.—Four-fifths of the rainfall lost by evaporation and runoff. Only 4.4 inches out of 23 left for vegetation.

LOSSES OF WATER BY EVAPORATION

Fort Hays Experiment Station records show that 48 inches of water are lost by evaporation through the 6 months from April 1st to October 1st from an open surface of water such as a lake.

This means, for instance, that a lake like Cedar Bluffs (6,600 acres) would lose in the six summer months 4 feet of water by evaporation, or 26,400 acre-feet.

"The effective precipitation is only the actual precipitation minus the evaporation and the runoff. An examination of an evaporation chart of the United States reveals clearly why, owing to variation in temperature, much more precipitation is needed in the southern porton of the Great Plans environment than in the northern latitude. At San Antonio, Tex., for example, the evaporation during the growing season (from April to September) is 46 inches; at Williston, N. Dak., it is only 30 inches. San Antonio would have to receive 16 inches more rainfall than Williston in order to have equivalent rainfall."

Evaporation and runoff of water need not be total losses. Considerable is being learned about farming methods by which both kinds of losses can be reduced. And more will be learned in the future.

Just one more way of conserving water.

[From the West Kansan, published by the Western Kansas Development Association, October–November 1959]

A Summary and Report on Water Conditions in Western Kansas

GREAT PLAINS RAINFALL IS SUBHUMID

Western Kansas is in the north and south belt across the central United States known as the Great Plains, as shown on the accompanying map. In this belt the amount of rainfall, etc., runs all the way from slightly subhumid to semiarid and arid.

According to authorities who have studied the matter, any annual precipitation amounts running from the lower twenties (inches) on down is deficient from the standpoint of maximum crop production. Annual average precipitation below 10 inches is considered arid or desert. Annual average precipitation in the teens and down toward 10 inches is considered semiarid. Of course, these division lines between the different degrees of aridity are not sharp but are chosen for the sake of having convenient areas of reference.

At the bottom of this page is a map of Kansas showing the longtime, average, annual precipitation by counties. It will be noticed that in the very most southeastern counties of the State this annual average runs around 40 inches. It gradually decreases as we go westward until in the westernmost tier of counties it runs between 16 and 17 inches per year on the average. Thus we see that at least the western third of Kansas must be classed as subhumid and even semiarid.

However, a thing that complicates the problem is the fact that there are periods of well above average and other periods of drought. WKDA research has revealed the fact that there is a regular pattern to these wet and dry periods and that makes it easier to plan and organize one's farming and business accordingly. (See precipitation record and cycle pattern on the next page).

Several of the early explorers reported that the region west of the Mississippi and Missouri Rivers was incapable of cultivation and was therefore unfit for habitation by the white man. These reports were correct in part in the light of what they then knew about methods of cultivating the land and conserving water and soil. But gradually, by research, trial and error, experience, and by the consequent improved methods of water and soil conservation, control and use, man has made progress in his growing of crops and in his management of the grasslands in this sometimes semiarid region. And by these same methods he will continue to make progress in overcoming the handicaps of a subhumid climate.

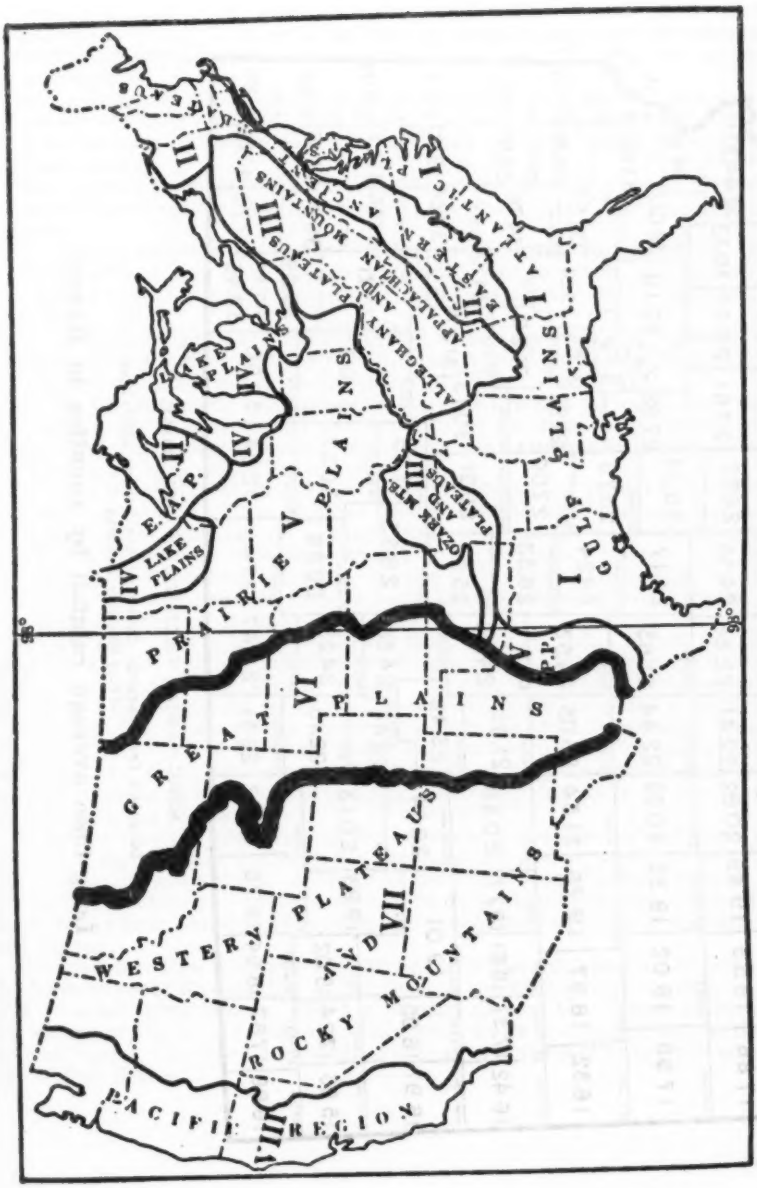
And so man has, not exactly made the desert blossom as the rose, but he has indeed made great progress in farming the lands and growing crops in these subhumid regions of the Great Plains.

There is still much to be done especially in making studies of the patterns of rainfall, of flood periods and of drought periods, of the storage, conservation and use of water, as well as in improvements in soil, crops, and grasslands.

DEMANDS FOR WATER EVER ON THE INCREASE

At the 20th annual meeting of the Kansas Reclamation Association held in Norton, Kans., on Friday, November 9, the program was largely built around reports of various agencies on the general theme of the ever-increasing use and demand for water and what is being done to enlarge the storage capacity of water in the State.

Reports were made by representatives of the Kansas Water Resources Board; the Army Corps of Engineers; the State parks authority; the Soil Conservation Service; the U.S. Bureau of Reclamation, and the National Reclamation Association. Jack Nicholson of Ellis is president of the Kansas Reclamation Association.



The Great Plains marked off on a map of the U.S.
From Webb's "The Great Plains"

Long-time average rainfall by counties in Kansas.

Weather Cycle Pattern Makes Possible Longtime Planning

Explanation of precipitation cycle pattern

A few years ago the research department of the Western Kansas Development Association, in studying the 90-year precipitation record at Hays, Kans., discovered a definite cycle pattern to the precipitation records in all of western Kansas and beyond. This cycle pattern has already been used by many farmers, bankers, and businessmen much to their advantage. What is this precipitation cycle pattern?

In its study of precipitation records, the WKDA research department was surprised to find that the 90-year record at Hays, Kans., as well as the records at other places in Kansas, was composed first of large cycles of approximately 22 years each.

Then each of these 22-year cycles was discovered to have a regular pattern composed of three smaller cycles or periods, always occurring in the same order as follows:

1. Wet period: An above-average precipitation period of 5½ years in which there has been excessive rainfall and in which widespread, major floods have occurred. For an example, see 1946 to 1951, inclusive, on the chart.

2. Drought period: The wet period is, strange to say, followed in each instance by a sudden drop in precipitation and 5½ years of drought. For example, see 1952 to the early spring of 1957. (See chart.)

3. Mixed period. Following the 5½-year drought period, there has always occurred a 9-, 10-, or 11-year period in which there is a mixture of above-average and below-average precipitation years, occurring in no regular order. Hence we have called it a mixed period.

The precipitation in the first year of this mixed period has always been well above that of the drought period. While the remaining years of this period have occurred in no predictable order as far as precipitation is concerned, they have always averaged up to normal or above. The length of this period has been variable—as low as 8 years and as high as 12 years. (The wet and drought periods have always added up to 11 years, equally divided between them.)

We are now (November 1959) in the third year of such a mixed period. How long the period will last remains to be seen, but judging from past records it will last 10 or 11 years, plus or minus. Anyone can take this information and do his own predicting for this mixed period and make his plans accordingly.

It was on the basis of the above data that the WKDA research department predicted in the fall of 1956 that the drought would come to an end in the spring of 1957. And so it did. Anyone by a study of the accompanying records and pattern could have done the same thing. And they can do it for the future, too, by just studying the record.

So we see that the approximate 22-year cycle is composed of a definite pattern, namely a 5½-year wet period, a 5½-year drought period, and a 10- or 11-year on the average, mixed period. A study of the Hays precipitation chart as printed herewith will show this cycle pattern to be quite regular in occurrence. Furthermore, it has been found to be true of any precipitation record in western Kansas and beyond.

How far does this cycle pattern extend? We have not studied it much beyond the boundaries of Kansas, but at the close of the 1952-to-1957 drought period the U.S. Weather Bureau sent WKDA a printed map of the United States showing the extent of the 5-year drought. This map shows it covering four-fifths of the United States. In like manner the 5½-year wet periods have covered much of the United States.

Prediction of weather by periods

By a careful, thorough study of the weather record pattern chart and explanation printed herewith, anyone can foresee the probable trend of the weather, that is, rainfall, and so forth for 5, 10, 20, 30, or as many years ahead as he wishes and make his plans accordingly.

What about daily, weekly, and monthly forecasts?

The WKDA cycle pattern has nothing to do with daily, weekly, or monthly forecasts. It (the records) show only what has happened by periods of years.

On the other hand, the U.S. Weather Bureau is constantly doing a better and better job of daily, weekly, and 30-day forecasts.

The daily forecasts for western Kansas are excellent. The 5-day forecasts are most helpful. But now the Weather Bureau is making what it calls a 30-day outlook.

PRECIPITATION RECORDS AT HAYS, KANSAS, FROM 1868 to 1958 INCLUSIVE

Average Annual Rainfall - about 23 inches

Years	Annual Rainfall	Average in inches
1844	------- Floods	
1867	------- Floods	
6 yr. Period: 1868	15.52	19.28 Drouth Period
1869	20.32	
1870	19.79	
1871	23.00	
1872	1636	
1873	20.68	
11 yrs.: 1874	26.88	24.73 Mixed Period
1875	32.08	
1876	28.64	
1877	35.40	
1879	20.62	
1880	20.88	
1881	20.88	
1882	15.27	
1883	21.14	
1884	20.04	
5 yrs.: 1885	25.95	24.91 Wet Period
1886	28.74	
1887	22.33	
1888	20.18	
1889	27.36	(Floods)
6 yrs.: 1890	15.17	17.42 Drouth Period (Dust Storm)
1891	24.21	
1892	22.53	
1893	18.16	
1894	11.60	
1895	12.64	
9 yrs.: 1896	27.70	26.83 Mixed Period
1897	26.73	
1898	31.55	
1899	21.68	
1900	26.38	
1901	22.85	
1902	34.65	
1903	32.52	(Floods)
1904	17.45	
5 yrs.: 1905	23.73	25.16 Wet Period
1906	23.08	
1907	25.40	(Floods)
1908	25.33	
1909	28.27	
5 yrs.: 1910	16.17	18.65 Drouth Period (Crop Failures)
1911	17.15	
1912	20.20	
1913	23.10	
1914	16.63	
12 yrs.: 1915	34.14	21.38 Mixed Period
1916	16.01	
1917	16.92	
1918	23.58	
1919	26.13	
1920	21.28	
1921	18.46	
1922	18.98	
1923	27.10	
1924	14.51	
1925	23.02	
1926	16.45	
6 yrs.: 1927	27.21	(Floods) 27.74 Wet Period
1928	29.94	
1929	26.57	
1930	25.03	
1931	26.06	
1932	31.66	
5 yrs.: 1933	16.26	17.29 Drouth Period (Dust Storms)
1934	16.06	
1935	21.87	
1936	15.90	
1937	17.86	
8 yrs.: 1938	22.11	23.11 Mixed Period
1939	15.85	
1940	22.91	
1941	28.13	
1942	29.61	
1943	16.19	
1944	29.70	
1945	20.34	
6 yrs.: 1946	26.48	27.97 Wet Period
1947	22.65	
1948	26.19	
1949	23.62	
1950	25.59	
1951	43.34	(Floods)
5 yrs.: 1952	13.39	16.65 Drouth Period
1953	21.07	
1954	18.44	
1955	21.16	
1956	9.21	
1957	28.33	Mixed Period
1958	31.21	
1959	?	

Prepared by: L.D. Wooster, Sec.
Western Kansas Development Assoc.

A STUDY OF A MIXED PERIOD

We are now in the third calendar year of a mixed period. We have been through a recent wet period of 5½ years (1946–51) and we know pretty well its characteristics. We have been through a recent 5½ year drouth period (1952 to the spring of 1957) and we know its characteristics. But, as stated above, we are now in the third calendar year of a mixed period and we do not know too much about such a period because, from past records, we see that it is truly a mixture, and an unpredictable one at that. And so we are particularly interested in following through this one to see what we can learn.

There have been four of these mixed periods in the 90 years since records have been kept at old Fort Hays and at the Fort Hays Experiment Station. And we are now in a fifth one. What can we discover by an analysis of those four mixed periods and the beginning of a fifth one?

First of all, we will notice that the first year of the mixed period is always a stepup from the drouth period which precedes it. And in four of the five cases the precipitation is well above average. For example, in the last year of our most recent drouth period which was 1956, the rainfall for the year was 9.21 inches. The next year was the first year of the present mixed period and the precipitation was 28.33 inches. (Our longtime annual average is close to 23 inches. The proper way to get the real average is to use an equal number of wet, dry, and mixed periods. If we throw in an extra dry period, as would now be the case if we take the whole record, we of course get a lower average, and not a correct one).

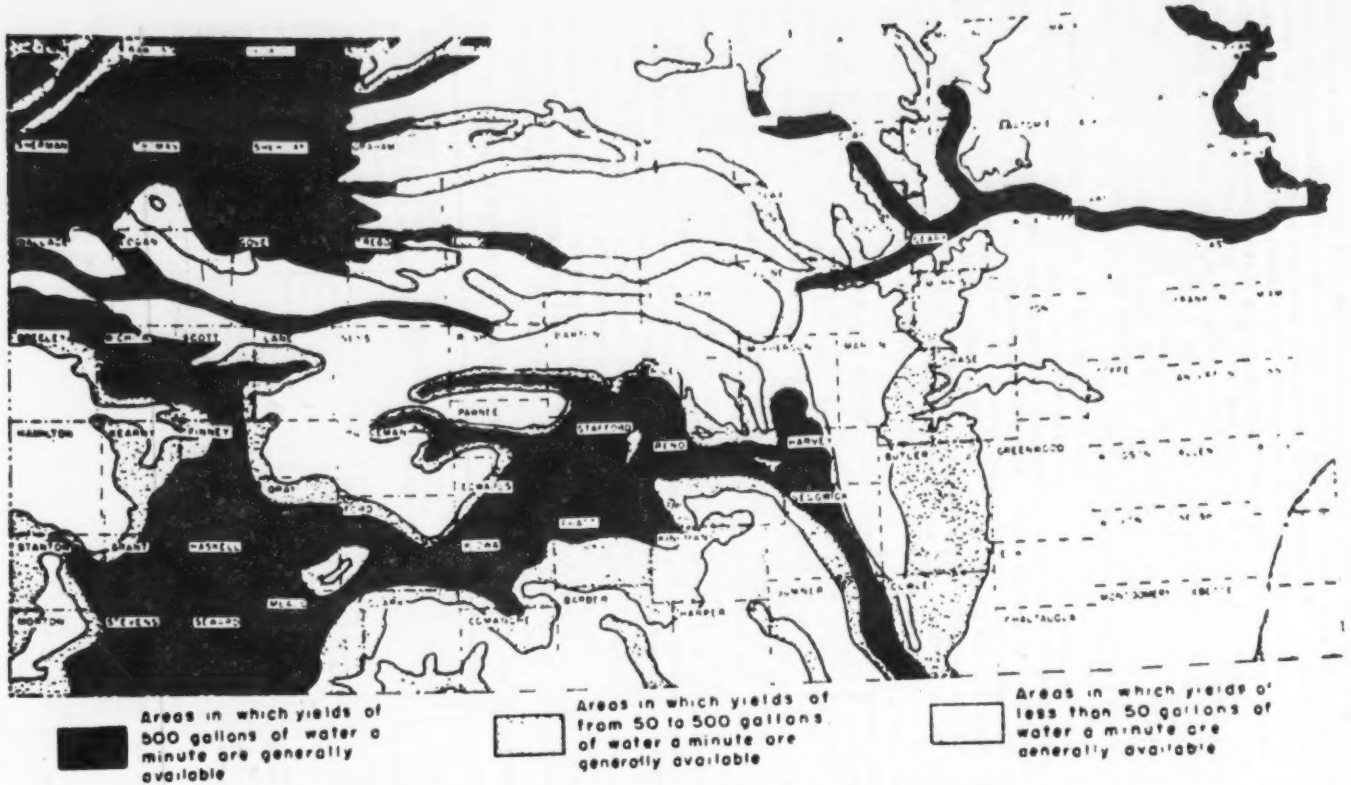
In the second place we notice that, while the wet and dry periods are almost exactly 5 years each in length, or a total of 11 years, the mixed periods are of unequal length, from 8 to 12 years long, but averaging about 11 years. However, we also notice that the longer and shorter mixed periods alternate in length. Since the last one (1938 to 1945) was one of the shorter ones, we might expect that the present one may be longer, say about 11 years. (Four cases are really too few to judge by but it is the best we can do at present.)

In the third place these mixed periods appear to be an unpredictable mixture of below average and above average rainfall years. It will be interesting to watch the present one. So far we have had three above average precipitation years on the calendar year basis, but actually we have had 10 months out of 12 which were well below average beginning with September 1, 1958 and running to September 1, 1959 and 7 of those below-average months were consecutive.

In the fourth place, the last year of the mixed periods has always been at least as far as we have records, below average, and of course the first year of the following wet period has always been a noticeable step-up in precipitation.

Chart of rainfall by months from March 1958 to October 1959, inclusive

Month	Actual rainfall in inches	Longtime average in inches	Plus or minus in inches	Month	Actual rainfall in inches	Longtime average in inches	Plus or minus in inches
1958—March	3.98	1.06	2.92+	1959—January	0.38	0.47	0.09—
April	1.62	2.44	.82—	February	.25	.79	.54—
May	6.81	3.44	3.37+	March	.83	1.06	.23—
June	2.33	3.60	1.27—	April	.53	2.24	1.71—
July	7.82	3.15	4.67+	May	6.40	3.44	2.96+
August	4.35	2.98	1.37+	June	1.55	3.60	2.05—
September	1.89	2.25	.36—	July	3.62	3.15	.47+
October	.54	1.41	.87—	August	2.25	2.98	.73+
November	.50	.83	.33—	September	5.10	2.25	2.95+
December	.13	.69	.56—	October	3.32	1.41	1.91+
				November	----------	.83	----------
				December	----------	.69	----------


Areas in which yields of 500 gallons of water a minute are generally available
Areas in which yields of from 50 to 500 gallons of water a minute are generally available
Areas in which yields of less than 50 gallons of water a minute are generally available

Showing ground water supplies in Kansas.

IRRIGATION DOUBLY IMPORTANT IN A SUBHUMID CLIMATE

In the February 24, 1958, meeting of the Western Kansas Development Association at Scott City, Kans. Dr. Carl F. Kraenzel made this statement: "The salvation of cropgrowing in the subhumid climate of the Great Plains is irrigation." Dr. Kraenzel is professor of agricultural economics and rural sociology in Montana State College. He has made a specialty of the study of the Great Plains, as shown on the first page of this issue of the West Kansan, with its subhumid to semiarid and even arid climate.

The question may well be asked, But where are we going to get the water for irrigation? The answer is not always easy. But there are several possibilities even in arid regions.

First of all, there is the melting snow of the mountains which is widely stored and used in near-the-mountain regions. There is also melted snow from the mountains coming down some of our rivers such as the Arkansas.

Then a second source is our rivers, especially if they have storage facilities.

A third source is water stored in large ponds and reservoirs. These are on the increase in western Kansas.

A fourth source is underground water. As will be seen by the accompanying map, western Kansas, being subhumid, is particularly well blessed with these underground reservoirs of water. (See next page for illustrations of use in western Kansas.)

RUSH COUNTY HOLDS IRRIGATION FIELD DAY

On September 1, the Rush County Irrigation District held its annual field day demonstrating five projects as follows: The first stop was on the Tom West farm to observe and to listen to a description of 20 varieties of grain sorghums grown under full irrigation (see "cut" no 3, above). The second stop was on the Frank West farm to see and hear about fertilization plots of grain sorghums of course grown under full irrigation (not pictured). The third stop included Lloyd West's front yard where a free picnic lunch was served—free through the courtesy of two bankers and Lloyd West—so we understood. The fourth stop was at the Seltman dam—the first big dam in Rush County. And the fifth and last stop was at the Willis Mohr farm to see his irrigation system and a thousands gallons of water a minute coming from about 70 feet down in the ground (see photos Nos. 1 and 2).

The whole field day trip was a fine demonstration of the value of applying water at the right time, when needed, to these sorghum and corn crops. Unfortunately for these farmers, not many days after the field day a flood swept through these fine fields. What the damage was could not be immediately determined. Some of the crops had been harvested. Perhaps the greatest damage was to the soil and the irrigation systems.

TO APPEAR BEFORE U.S. SENATE WATER RESOURCES COMMITTEE

While this issue of the West Kansan was in process of preparation an invitation came from Senator Andrew F. Schoeppel of the U.S. Senate Water Resources Committee to appear before a hearing of that committee in Topeka, representing the Western Kansas Development Association and its studies of rainfall, water storage, use, conservation, and control. The invitation has been accepted and copies of this issue of the West Kansan will be taken along as a summary of the WKDA studies.

1. 1,000 gallons a minute from underground. On the Willis Mohr farm S.W. of Otis.

2. Used to irrigate grain sorghums (in the foreground) and corn (in the background).

3. Demonstration of 20 varieties of grain sorghums grown under full irrigation on the Tom West farm west of Ruah Center.

4. Corn grown under irrigation on the Lloyd West farm. Being cut and run through the forage chopper for silage.

Mr. WOOSTER. One of the three parts of the definition of the Great Plains is that it is deficient in rainfall.

One writer on dry farming has made this classification of subhumid moisture. Less than 10 inches are arid or desert. That is on the actual average, year in and year out.

From 10 to 20 inches he called semiarid.

From 20 to 30 inches he called subhumid.

And about 30 inches humid.

In this report we have given some figures on this matter of evaporation which I will not read, on page 3. Evaporation and runoff.

But I would like to turn to—first, I would like to call your attention to the first page of this West Kansan, which shows the area that is called the Great Plains.

Then at the bottom of the page is a map of Kansas showing the rainfall by counties and it will be seen that at least 30 inches, almost two-thirds of the State is involved.

When we get out in the western third we get into what really would have to be called semiarid.

Now, this rainfall, of course, these averages are averages over a large number of years. But that is quite variable. We have taken the records of the rainfall at Hays, Kans., which now covers 90 years and discovered that there is a pattern to it, a pattern of about 22 years in length consists of three parts.

The first one on this record was a dry period, a drought period. The rainfall was below our average at Hays, which is about 23 inches.

The next period is what we called a mixed period because it lasts about 11 years with unpredictable order or years below average and above average.

The third part of this 22 years period, approximately 22, is a wet period in which the rainfall was 25 inches.

You go on down the list. We were as much surprised as anybody to find that there was a regular pattern to it. What the cause of that pattern is, we don't know yet.

There are some theories. But a study of this chart of precipitation records and the cycle pattern which there is might lean to the possibility of some long time weather predictions.

It is by periods. We are now in a mixed period. Following that will be a wet period in which we have major floods.

Then there will be a drought period.

I think that is all I need to take time for.

Mr. CHRISTY. Thank you, Doctor, and thank you members of the committee.

Senator SCHOEPPEL. Thank you, gentlemen, for your presentations here.

The CHAIRMAN. May I say something?

Senator SCHOEPPEL. Surely.

The CHAIRMAN. I want to thank the doctor for his statement. Especially this tabulation of the 92 years information as to the rainfall, and the development of the data showing this regular pattern.

Apparently, Doctor, that thing has followed that pattern without variance, has it not?

Mr. WOOSTER. I would like to say, Senator Kerr, that I think this would only have been discovered in a subhumid region.

By the time you got down here in eastern Kansas, for example, there are too many other factors entering into it and covering up the pattern, that I find the pattern is still there.

The CHAIRMAN. Even in the eastern part of the State?

Mr. WOOSTER. Yes, but it is rather, I don't think it will be discovered down here in the first place.

The CHAIRMAN. I think that is a very valuable contribution you have made. It shows if that pattern can be established it will be of great help in making a long-range plan as to when you can have the best opportunity to capture water which will be available.

That is all.

Senator SCHOEPPEL. I want to say that we want to try to keep on this time schedule. We are running a little behind.

It is our thought we will run after the 12 o'clock time to try to pick some of it up.

The next group is the soil conservation group, Coordinator Howard Elrod of Borden, Kans.

We are glad to have you gentlemen with us today.

You may proceed.

STATEMENT OF HOWARD ELROD, FARMER AND ENGINEER, COWLEY COUNTY, BORDEN, KANS.

Mr. ELROD. Senator Schoeppel, Senator Kerr, I am honored to appear at this hearing of your Select Committee on National Water Resources.

I am Howard Elrod, a farmer and engineer from Cowley County.

I am chairman of the State soil conservation committee and the watershed review committee, and also I am appearing here today on behalf of the Kansas Association of Soil Conservation Districts of which I am a former president.

There are 105 soil conservation districts in Kansas, 1 in each county, and the programs developed by these districts are supported by 75,000 cooperators representing 25 million acres of land.

The State itself supports an appropriation for my committee and its activities, and county governments are authorized to spend up to $3,000 for direct clerical aid for each of the districts.

Five hundred and twenty-five supervisors and numerous assistant supervisors devote much of their busy schedules to the administration of these districts by gratis work. They do this because they believe in soil and water conservation for the benefits, not only to their communities, but the Nation as a whole.

Farmers and soil conservationists in all sections of Kansas are appreciative of the value of such basic programs as soils mapping, topographical mapping programs, and the geological studies of both surface and ground water conditions.

While many other groups are also benefiting by these programs, they are of great value to individual farmers as well as those participating in group benefit programs such as watershed development.

The areas adequately covered by these studies are quite spotted and the progress is seemingly slow. The people whom I represent believe this would be a field on which additional emphasis of acceleration could be stressed.

The backbone of soil and water conservation development in Kansas, as in other States, is the soil conservation technical assistance which is made available to us by the Federal Government. We are extremely appreciative of these services and have been utilizing them to the fullest extent; in fact, the demands are coming from every section of the State for additional personnel to supplement those already there.

This demand is due from many factors, the first one, probably, is that the techniques of land treatment processes are being refined and require more time per acre.

Another factor is the demand of an increasing number of farmers for their services.

Also, a great many programs which we wholeheartedly endorse, such as the watershed program, the Great Plains program, and other specialized developments are added workloads on the backs of service personnel until they reach the stage whereby they are sustained by their respective appropriations.

These specialized programs have developed over the years and constitue a necessary demand on the time of technical personnel, other examples are such activities as conservation needs inventory and monitoring of radioactive fallout.

Congress, as we know, has been adding funds for soil conservation technical help, but as an example of the inadequacy of this we cite that the increase for fiscal 1960 did not cover even the automatic pay scale increases for service personnel.

We are proud of the progress of soil conservation in this State, however, as an illustration of the job yet ahead it will take 25 to 30 years to complete just the basic farm planning job.

To develop the application of the needed practices will require from 40 to 50 years. We believe and recommend that the appropriations for the Soil Conservation Service can be increased and that increase utilized efficiently.

We have no reason to assume other than that Kansas is getting its full share of the national appropriations, but feel that we can make additional utilization of these services.

The agricultural conservation program assistance which is available to Kansas has been of inestimable value in accomplishing the needed land treatment throughout the State.

Here, again, while we assume that Kansas is getting its proportionate share, the demands are far from met and many counties, year after year, use up their allocated funds by early fall.

The nature of this assistance is such that the cost sharing by the farmer accounts for a large part of the enhancement of the value of the land itself, and the Federal share is resulting in enhancement and protection of the resources of the Nation for posterity.

Kansas has long been a leader in authorizing only those practices for payment which have long time and lasting conservation benefits; in fact, our State is using a higher percentage of the ACP allotment for enduring practices than any other State in the nation.

The groups which I represent, therefore, encourage the most liberal appropriation of funds for the agricultural conservation program.

We believe that the points which I have mentioned are needs for each and every section of the State of Kansas, and that the results from these requests will be beneficial to all areas of the State, as well

as being basic and beneficial to specialized developments such as the watershed program which is to be presented to your committee as a separate topic.

Mr. Oman Browning, chairman of Kansas ASC Commission, is present and endorses these statements that I have just made concerning ACP funds.

Land treatment and proper land use will not only benefit the specialized agricultural water projects, but will prolong the life of structures such as constructed by the Corps of Engineers and Bureau of Reclamation through sediment reduction.

Many sections of Kansas are not adaptable to project development as sponsored by any agency and land treatment is the only answer to water management and control problems.

In summary, I would like to say that Kansas is appreciative of the basic research programs of the Federal Government and is extremely appreciative of the SCS technical assistance and the agriculture conservation program assistance.

We believe that we are utilizing these services efficiently and that our demand is such that increased appropriations to them will also be utilized efficiently.

We, therefore, respectfully submit these as our primary needs for the next 20 years.

I thank you and I request that this be made a matter of record.

Senator SCHOEPPEL. It certainly will.

Thank you very much.

Mr. ELROD. I have with me other members that are interested in the soil and water conservation program of Kansas, and I would like to, at this time, introduce Howard Miller, former U.S. Congressman from Kansas, who has a statement to be entered in the record.

Mr. MILLER.

Senator SCHOEPPEL. Mr. Miller, we will be very glad to hear from you.

STATEMENT OF HON. HOWARD MILLER, FORMER U.S. CONGRESSMAN FROM THE STATE OF KANSAS

Mr. MILLER. Mr. Chairman, Senator Schoeppel, it gives me pleasure to meet before this group for the double reason, meeting with old acquaintances that I knew in Washington, but especially for the reason that I am very much concerned about the soil and water conservation program in this country.

I personally am operating several farms. I have constructed largely at my own expense more than 40 miles of terraces on my land and more than a half dozen real detention dams.

Therefore, I am at least partly in position of the great Roman general who commented on his activities by saying all of which I saw and a part of which I was.

I have perhaps the enviable situation of having seen and observed a great deal of what has happened in the way of soil and water not conservation, but soil and water waste and destruction, over a great part of the eastern part of Kansas.

I arrived here when I was a small boy, coming from Pennsylvania; but I can look back and remember when these hills that are now sown with wheat or planted to corn or other crops—maybe washed off pas-

turelands that conceal the erosion—I can remember when they were covered with great areas of waving bluestem. And there were no ditches. You could drive from Hiawatha to Seneca even when they were villages and not cross a single ditch.

There was a creek here and there, but there were no ditches. Where our ditches are now there was a flying, waving grass that held the water that could not be washed out.

But what we do find now? We find that this grass is either plowed up or perhaps it was pastured and the cattle made a path nearly right down the middle and killed out the slough and the water washed it into a ditch.

What was the result? In those days there were springs up nearly all of these draws in my county of Brown, especially in Hamilton Township where my land is you will find a number of dwellings out in the middle of a section.

Why are they there? Because there was a spring there.

But there is no spring there now. Why is it? What has happened?

This is what happened: When these draws were washed out through the fields—and I saw hundreds of them as I came down here, this morning, driving overland—when these draws were washed out they became a natural canal to drain the underground water out of the soil.

If we had been planning to reduce the water level in this country, especially in eastern Kansas, I cannot speak for western Kansas, we could not have done a better job than to have created these ditches and these ravines to drain out our subsoil.

What has been the result? I can remember well when most of our wells were 30 feet deep. They were dug and walled up.

Now we have had to drill down into the bottom another 40, 50, or 60 feet to go to a lower water level.

I can remember when there were springs that fed our creeks, flowed with clear, flowing water, and now they are mud banks. There are no swimming holes at the bend. No; it is just a narrow channel that has been filled in by the good soil of our farms.

To me, gentlemen, one of the great problems before this country is to return insofar as it is practical to something like the condition that existed here before the white man made all these ravages.

I am not condemning my father and those who followed him, nor even myself too much, although I think I maybe washed more soil off of Brown County than most of them because I was operating in a bigger way.

I would like to do, and I would like to see others do, and I know these conservation people feel that way, we would like to make amends insofar as we can for the evils that we created.

You know, didn't John say all that treaded the earth are but a handful to those that slumber in her bosom?

But all that breathe the breath of life today are but a handful of those who shall come after us and we owe an obligation to them.

That is why I am here, not representing any organization, being honorary, I maybe have about all the soil conservation organizations there are in the State.

Though only honorary and having no office, although I was and I feel proud of this—I was the first president of Walnut Creek watershed, which is being developed in Brown County.

And we have in Brown County, if I have another 30 seconds, we have in Brown County the little Delaware Mission Creekpilot watershed and it has been fully developed and it is being proven there that we can return to those conditions when there will be general springs feeding our creeks, springs flowing down these draws, when once more what are now gullies will be flat waterways that we are making to hold the soil.

I would like to say parenthetically, especially not to the Senators so much as to these soil conservation people, that we are going to have to save these waterways; the same thing that happened to the old slough grass that wash it out and made these deep gullies will happen to these waterways that are being formed now.

My plan then is this: that instead of running the cattle there and letting them wash down through this fine bed of grown grass that we are sowing now, I am putting fences across about every 20 rods to make those cattle turn out and go somewhere else and that will stay and if we don't do it they will wash out sooner than they did the first time.

I am confident that the underground reservoirs, the sand and the gravel that was put here by nature, perhaps largely by the grass earlier, hold more water and do a better job of that, and prevent evaporation that we have been hearing about, than all the surface dams that we could possibly create.

Not that I am opposed to surface dams; I have testified before that every dam should stand on its own merits. But there should be very carefully placed dams where they are feasible and practicable.

I thank you, gentlemen.

Senator SCHOEPPEL. Thank you, Mr. Miller.

Mr. MILLER. Mr. Chairman, I have a formal statement that I wish to be made a part of the record.

Senator SCHOEPPEL. It may be entered into the record at this point.

(The statement referred to follows:)

STATEMENT BY HON. HOWARD MILLER, FORMER U.S. REPRESENTATIVE FROM THE STATE OF KANSAS

Mr. Chairman and honorable members of the committee, it gives me no little pleasure to appear before you, partly because of seeing again the faces of Members of the Senate whom I knew as a Member of the 83d Congress, but more especially because the subject under consideration of the committee, that of the water resources of the country, is one to which I have given many years of careful study and investigation. I feel sure that the members of the committee will be interested in learning what has been done in this part of the country to solve this problem.

Having been a close observer of the operation of the soil and water conservation program, and having constructed more than 40 miles of terraces and half a dozen detention dams on my own farms, I am somewhat in the position of the famous Roman general, who wrote in his commentary: "All of which I saw, and a part of which I was."

I should like to lay before the committee the close relationship between soil conservation and water supply; that the water supply in the form of rain is relatively constant; that it changes little throughout the world in periods of thousands of years. Our problem, then, is how best to conserve it for the use of mankind.

Originally, when men were only herdsmen, it was almost wholly a matter of using the water where found. Then came the digging of wells and the construction of cisterns in the less-favored areas, to carry over a supply from the season of greater rainfall to that of lesser. It was largely a question of water for domestic animals. The amount needed for human use was comparatively little.

But with the development of the mechanical age, this relationship has greatly changed. With the diminishing number engaged in agriculture and the greatly augmented number engaged in manufacture and distribution of goods, the requirement of water for cities has become one of the great problems of civilized man. How best so to conserve and manage the fresh water supply is the problem.

In the course of nature, undisturbed by human activity, the water, except in desert areas, fell upon grass or forest land. Here the vegetative cover held the rainfall upon the surface so that the greater part soaked into the topsoil, until, under the pull of gravity, it penetrated into the subsoil, filling the sand and gravel beds that underlie every area of the land surface of the earth. This underground supply of water, issuing in the form of springs and furnishing the supply for wells, is, and must always be, the chief source of water to supply human needs.

The capacity of the soil surface and underground reservoirs to contain water, according to some recognized authorities, is almost unlimited, far exceeding any artificial capacity that could be imagined in the way of manmade reservoirs.

The great hindrance to full use of this capacity is the fact that the grass and forest cover provided by nature, and which contributed to the insoak of water into the soil, has been largely destroyed, so that rain no longer falls upon a vegetative cover, but upon bare ground, which is, by the impact of the falling water, made largely impervious. Consequently, the runoff into the ravines, creeks, and rivers is greatly accelerated and increased. This loss of the greater part of the water that falls upon the earth as rain and snow, due to the denudation of our forest land and the destruction of the vegetative cover owing to modern methods of agriculture, is perhaps one of the most serious problems facing the Nation.

It was to meet this problem that Congress has, in recent years, established the Soil Conservation Service. This program began under the leadership of Gifford Pinchot, Theodore Roosevelt, and Hugh Bennett, when the country was awakened to the fact that, through the use of modern tools and machinery we were rapidly destroying our valuable forests and washing our lifegiving topsoil into the Atlantic and Pacific Oceans and the Gulf of Mexico.

It was found that, through modern methods of agriculture, and largely due to the invention of the steel moldboard plow, the soil has been increasingly left bare of vegetative cover and, consequently, subject to increased runoff and erosion. This resulted in twin evils; it carried away the fertile topsoil, which is lost, not only to the present but to all succeeding generations, and it produced ever-deepening gullies and ravines which served to drain off what water did penetrate into the beds of sand and gravel lying beneath the surface. Unfortunately, this evil is not confined to the cultivated areas, but even in the strictly pasturelands, great gullies have been formed where paths made by cattle through the slough grass that for ages had held the soil, were washed out, resulting in the formation of deep gullies, which not only carried away the soil and surface water, but drained away what water did penetrate into the subsoil. As a result of these twin evils, most of the springs which formerly fed the creeks of this area were dried up and nearly all the wells had to be drilled to a lower water level. Many creeks dried up altogether, and in all the flow was greatly reduced. As an example of the latter, the flour mill once located on Walnut Creek, the principal stream traversing Brown County, which for many years furnished flour for the early settlers for miles around, had to be abandoned for want of a dependable flow of water. Governor Morrill once had a waterpower-driven sawmill on this creek.

I am delighted to inform the members of the committee that there is now a Walnut Creek Watershed Association, which will largely restore those conditions which formerly produced the springs that fed our once clear-flowing creeks and rivers.

Becoming aware of the serious loss of our topsoil and of the increased runoff and consequent loss of the water, the Congress provided for a program of terracing to slow down the runoff and act as a testing operation to observe and prove effects of such a program. One such test area was located near the town of Mankato, in the northeastern part of Kansas. This experiment came up to all expectations, but it did not fully answer the problems of control of excess water. It delayed and diminished the runoff, but the water that left the terraced field, once in the natural waterway, ran with the same speed under the same pull of gravity, that it had always done. In other words, the water was controlled only on the particular field where it fell. Naturally the next move

was to control the water after it had left the area where it fell and was on its way to the creeks, rivers, and finally the ocean.

Acting on the advice of leading students and observers of the situation, the 83d Congress provided for a system of pilot watersheds, whereby it was planned to develop small watershed areas, wherein the major part of soil conservation work had been done, by construction of dams at suitable locations to detain, for a limited time, the runoff water from the conservation areas above. It was the belief that such a program would largely prevent serious damage to the land, towns, and cities lying below the fully developed watershed area. One such pilot watershed was located in Brown County, Kans., and is known as the Little Delaware-Mission Creek Watershed. This area has been fully developed and the plan has proven 100 percent effective in accomplishing what it was intended to do. Results from exceedingly heavy rainfall have shown that this area will never contribute to flood damage to areas lying below the detention dams constructed to slow down the runoff from the land above them.

Similar watersheds have been developed in other States and on larger scale with the results gratifyingly similar. The development of the Sandstone watershed in Oklahoma in the Washita Basin is a fine example of the fact that a return, so far as practicable, to the condition in nature, wherein the major part of the rainfall was compelled to soak into the soil rather than to run off as surface water, will restore the underground supply which produced the thousands of springs which fed the clear-flowing creeks and rivers that the white man found throughout the entire midwest area when he entered it only one century ago.

A study of the situation at that time, of the present conditions, and of what happened in between, must lead to the conclusion that the best way to conserve the rainfall—and that is our only source of supply—is by such a coordinated program of soil and water conservation as will produce the greatest amount of insoak into the natural underground reservoirs where there is no loss by evaporation.

This, it seems to one who has made years of study and observation, is the most practical, if not perhaps the only solution to the great problem of sufficient water to supply modern requirements.

Surface impoundments, where found to be feasible, in consideration of all economic and social factors, might well become a supplementary part of the program, but only supplementary.

The underground reservoir must always remain the main source of supply.

Mr. ELROD. I would like to present at this time to the Senators, State Senator Charles Joseph, from Butler County. The county which he represents is 85 percent under watershed district A.

STATEMENT OF CHARLES JOSEPH, POTWIN, KANS., PRESIDENT, WHITEWATER WATERSHED DISTRICT

Mr. JOSEPH. Senator, Senator Schoeppel, I am going to read from the prepared statement that we have filed for the record.

Mr. Chairman and members of this committee, we are pleased to be able to testify at this hearing of your Select Committee in National Water Resources.

I am Charles Joseph, and reside in Butler County. I am a livestock farmer and a member of the Kansas Legislature where I have served on the senate water resources committee for several years.

I have long been interested in soil and water conservation and development; am president of the Whitewater Watershed District, an area of 325,000 acres situated in Butler, Sedwick, Harvey, and Marion Counties.

It is a pleasure to appear before you at the suggestion of the Governor's watershed review committee, and as a representative of the many organized watershed interests in the State.

First of all, we would like to state that the people in the watershed program in Kansas emphatically endorse soil mapping and geological

survey programs and the going soil conservation programs which are basic to watershed development as well as other needs of this State.

Kansas, with its 50 million acres of land, probably has a watershed development potential of somewhere around 40 percent of the area. This excludes the flood plains of some of the major rivers, small tributaries thereto, and great areas in western Kansas in which runoff is not a difficult problem.

The interest in Kansas has been indicated by 30 watersheds which have been formally organized, comprising about 3½ million acres of land.

Eighteen other areas, totaling 2½ million acres, have applications pending.

Many communities are studying the situation and making plans for eventual organization. Interest has been demonstrated in another manner—37 applications, totaling 2,760,000 acres for Public Law 566 assistance, have been received by the watershed review committee of the State.

Twenty-six have been approved to date.

Nineteen actually authorized for planning, and planning completed on 10 comprising 700,000 acres.

It is expected that another 10 applications will be forthcoming, comprising 1,600,000 acres, next year, and the following year probably 11 more, totaling 1,800,000 acres will be received.

In addition to the formally organized groups and project requests under Hope-Aiken, many small tributary areas in the State have developed miniature watershed programs by group action under the going ACP assistance.

Kansas State government has not been standing idly by while this interest developed. In 1953 it enacted a Watershed District Act to enable areas to form organizations of legal entity with powers and authority commensurate with responsibilities incurred in the watershed program.

This act has been constantly revised in the legislature, and it is now thought to be one of the most workable in the Nation.

In addition, the Governor has set up a watershed review committee for the purpose of evaluating applications and making recommendations for their approval and subsequent priority for purposes of planning.

The State legislature has also provided funds for a watershed office under the State soil conservation committee. A great deal of interest is being displayed toward the State participating in the planning phase of the program to supplement the now inadequate resources of the Federal planning party.

Local sponsors in many cases are assuming responsibilities over and above the required obligations of local people under the Public Law 566 program.

Many districts are hiring additional rod and survey men to assist the planning party.

One area of four watersheds is contracting for an aerial survey to expedite work of the planning party when it becomes available.

My own Whitewater district has hired a fieldman and an assistant whose full-time jobs are to expedite the land-treatment program and develop information usable when planning time arrives.

Thus, we have outlined the watershed potential in this State, and have indicated the expanding interest to date; and attempted to demonstrate some of the things that we are doing to make the program successful.

We believe that there are many things which from a Federal standpoint would be helpful to this development, in a constructive and ever-expanding manner.

First of all, the policy of assigning only one planning party to a State is grossly inadequate in Kansas. Our present applications on file and those foreseeable in the next 2 years, will create about 12 to 15 years' work for a planning party.

While our State is hoping to supplement these forces, we believe that expansion of the Federal assistance in this area would be appropriate and in the public interest.

Secondly, while we know that the Federal appropriations for construction of watershed projects has been adequate up to now, we believe that the time has arrived when they will be inadequate to meet the demand.

Using planning costs for the Federal share of watersheds which are now planned as a guide, we will require some $500 million in this State alone for construction funds, if our potential of 40 percent of the area is utilized.

Projecting this on a 20-year basis, Kansas, alone, can put to good use all of the funds which are currently being appropriated nationally for watershed construction.

Thirdly, it is our since belief that the watershed program is the answer to smalltown and agricultural water needs in eastern Kansas. Whereas, the opportunity exists at this time, the criteria for inclusion of water in project development is so strict that the costs are almost prohibitive for many individuals and small communities.

We feel that the excessive movement of population to the congested cities can be alleviated as small communities are able to furnish opportunities for local employment.

Water is always essential in this endeavor. Some people call it agri-industrial development, but it may go under other names.

The immense agriculture resources of this State are capable of producing enormous amounts of primary wealth, much of which will no doubt be processed locally throughout the State in event we have a well-balanced development of our water resources, affording reliable sources of water to users in agri-industries that may not be necessarily located in a few large urban areas of great population.

Thus, both reducing agricultural surpluses and alleviating the congestion in our metropolitan areas.

The watershed program is the answer to this social and economic dilemma in several respects:

First, where costs are lowered small rural municipalities can afford to develop water supplies storage for their needs.

Secondly, it may be developed for streamflow regulation and pollution abatement.

Collectively, these benefits extend far beyond the local areas and are definitely in the national interest.

In conclusion, I would like to say that we in Kansas believe that the watershed program is sound. We have approached it in a positive

manner. Our program is not an alternate for other programs offered, and is not anti toward other types of development.

We have outlined our potential, our interest, and a portion of the things which we are doing. We believe that it is of paramount importance that you carefully consider the needs which we have outlined, namely:

1. Adequate planning resources to the State;
2. Construction funds commensurate with the demands; and
3. Criteria or appropriations, or both, for development of water storage which is rapidly becoming such a necessity to small communities as well as the Nation at large.

Thank you for your time, gentlemen. That concludes the prepared statement.

Senator SCHOEPPEL. Thank you very much, Senator.

The CHAIRMAN. Senator Schoeppel, I am going to make a suggestion for your consideration.

(Discussion off the record.)

Senator SCHOEPPEL. Before we hear the next witness I want to acknowledge the presence of my good friend, Congressman Ed Rees of the Fourth Congressional District.

Ed, it is awfully nice to have you here.

Proceed, Mr. Elrod.

Mr. ELROD. Senator Schoeppel, I wish to present Grant Engle from the Dickinson Watershed Association; also president of the Turkey Creek Watershed.

Senator SCHOEPPEL. We are very glad to have you here, Mr. Engle.

STATEMENT OF GRANT ENGLE, ABILENE, KANS., DICKINSON COUNTY WATERSHED COUNCIL

Mr. ENGLE. Senators Kerr and Schoeppel, I am filing statements with the Senate select commitee from the following groups:

Twenty-five copies from the Wakarusa, Clarks Creek, Lyons Creek, Turkey Creek, Rock Creek County Watershed Associations, and from Humboldt, and from individuals, Mr. and Mrs. Akins, who went to a great deal of trouble to file a statement being landowners in the Turkey Creek Watershed.

Senator SCHOEPPEL. Those statements will all be received and noted and become a part of the record.

(The statements referred to follow:)

STATEMENT OF THE WAKARUSA WATERSHED ASSOCIATION

The Wakarusa Watershed Association joins with other like associations in the Kansas River Basin in petitioning the select committee of the Senate to expedite in every manner possible the completion of the watersheds that have been organized in this basin and elsewhere. The flood-control measures associated with the watershed developments hold much promise in mitigating flood losses and therefore should precede the authorization of major flood-control structures. The authorization of major flood-control structures will not only paralyze but completely extinguish the possibility of developing watersheds on many lesser streams in need of expanded land and water conservation programs.

Watershed legislation is new and as yet poses a whole series of vexing and delaying problems before its purpose can be achieved. Like much new legislation, the Hope-Aiken Act reflects good intent but also a considerable degree of caution because of the complexity of the problems it deals with. It places a

great burden of effort on local communities to gain watershed developments. Voluntary and spontaneous movements must get underway to initiate the programs. Individuals must spend much time and money to organize meetings, carry out educational programs, and organize sponsoring districts. Unlike the flood-control projects of the Corps of Engineers, communities do not have trained and paid technicians to plan finished programs at little cost to benefited areas. Sacrifices in local taxes and land accompany the watershed programs and so serve to excite a measure of local controversy. Moreover, State and Federal legislation on watersheds is loaded with provisions calling for delays of various kinds to assure equitable action. We do not feel that these safety provisions are necessarily bad, but they bring numerous delays and may prove fatal if a major flood-control structure is authorized in areas where watershed movements are underway.

Because of inadequate financial support the watershed programs in Kansas—and elsewhere—have reached a state of almost total despair. Nearly 40 watersheds are in various stages of development here in Kansas, and about 35 districts have been organized under State law. However, only in one district are contracts being let to begin construction work.

The nearly 40 districts mentioned above cover a total of about 3 million acres of land. Developments on this land cannot begin until technicians have prepared detailed plans. These technicians serve in crews and only one crew is presently operating in Kansas. Under optimum conditions this one crew can provide watershed plans for about 300,000 acres per year. It follows that many districts are faced with many years of waiting before even a plan for development can be considered for action. These delays added to those mentioned above yield a prospect that spells almost total disillusionment and defeat.

Logic and experience dictate that watershed programs should precede rather than follow major flood-control structures. The watershed program spells land and water conservation, and this program should be applied where the water joins the land as rainfall or some other form of precipitation. Erosion problems in headwater areas may be less spectacular than flood losses in the short run but will prove more disastrous in the long run. The Hope-Aiken Act serves as a strong inducement to maximize land and water conservation. These developments can be planned and justified only where adequate benefits in flood losses can be achieved. These benefits are often lost if a major structure is placed in a large stream, converting the lower portions of tributary streams to storage sites. Moreover, the amount of potential floodwater stored in watershed structures will materially reduce the need for large structures in main streams and will certainly reduce their size and cost. This will also mean a great saving of some of our most valuable agricultural lands.

The committee of the Senate should also be reminded that the present emphasis on major flood-control projects is self-defeating and calls for new approaches. Although increasing millions of dollars have been spent on flood control, flood losses have mounted faster than expenditures. A given measure of flood-control work yields a larger measure of public confidence, which is translated into high-value developments in areas that are still hazardous. Expanded watershed developments in headwater areas and land-use zoning in hazardous flood areas must certainly be joined with other measures to achieve real flood-loss protection.

For expanded statements on these multiple needs we refer you to the following studies:

(1) Gilbert F. White (University of Chicago), "A New Attack on Flood Losses," State Government, Spring, 1959.

(2) Francis C. Murphy, "Regulating Flood-Plain Development," University of Chicago, Department of Geography Research Paper No. 56, 1958.

(3) Gilbert F. White, Wesley C. Calef, James W. Hudson, Harold M. Mayer, John R. Scheaffer, and Donald J. Volk, "Changes in Urban Occupance of Flood Plains in the United States," University of Chicago, Department of Geography Research Paper No. 57, 1958.

The Hope-Aiken Act should also be changed to allow for greater flexibility with regard to the size of structures and their use. The present limit on the size of structures seems arbitrary and does not fit the facts of terrain and community needs with regard to water. In many parts of eastern Kansas the need is urgent for the storage of water rather than for flood-control structures that are nearly empty most of the time.

We also want to emphasize that watershed programs with their small and moderate sized structures destroy almost no first-class flood plain land, which

is at a great premium here in eastern Kansas. Major flood-control structures, on the other hand, are always disastrous experiences for some of our most prosperous and productive communities in that they destroy permanently large acreages of our best land. This fact and prospect underlines the need to begin water conservation programs on the lesser streams where all great floods originate.

In summary, we wish to emphasize that our association considers the Hope-Aiken Act a most significant milestone in conservation legislation. Unfortunately it is still cumbersome in application and lacks adequate financial support. Together these problems mean much delay in translating plans into reality. What is needed is streamlined legislation on State and Federal levels, more money for watershed works, and a proper correlation of all plans designed for water control.

Respectfully submitted by the steering committee of the Wakarusa Watershed Association.

A. R. Henderson, Nathan Probst, Paul Zirkle, Hugh Moore, Philip Cazier, Joe Luthye, Wm. H. A. Matney, Nelson M. Young, Sr., Patrick Anderson, Joseph Clough, Ervin Steele, Ira Faust, Sr., Owen Mitchell, Robert Wilson, Wilson Counts, Carroll Gerstenberger, Gilbert Jones, Walter M. Kollmorgen, Carter Anderson, Chairman.

TURKEY CREEK WATERSHED STEERING COMMITTEE REPORT

It was early in 1956 that the men of the New Basel community considered a project which would honor the faith of her fathers and would provide unborn generations with a heritage rich and assured. 1957 saw these dreams beginning to take shape in the form of a conservation program backed by a concern for keeping the earth beautiful and by the concern for loss of life and property when rain which had caused damage locally proceeded downstream with devastating force. This twofold purpose has dominated our efforts, namely, to manage natural resources properly and help, to the best of our ability, to prevent local and downstream flooding.

In the first 18 months of our program the Dickinson County work unit conservationist, Luther Jacobson, said, "More conservation work has been done in the last 18 months than in 30 years before." We have full backing of the farmers in the conservation work and have full support of the Soil Conservation Service, an agency of the Federal Government.

In all areas where the program of conservation and flood control has been completed not only has flooding been reduced to a minimum, but the agricultural areas have increased in productivity by 150 percent, population has been stabilized and human resources have been preserved. The amount of work being accomplished on the farms shows that the concern for conservation and flood control is a genuine concern of the farmers not for their good alone but for the benefit of our American society.

Because the Federal flood-control program through Public Law 566 is yet in its infancy it should be given a fair opportunity to do the job in agricultural areas. When water resources and management are considered, not only should agencies which historically have been connected with the matter be responsible, but all agencies related with the problem should be responsible. Water is a concern of agriculture, factory, industry, health, homes, recreation, plant and animal life because adequate supply is needful to all. All Government agencies concerned with such matters should be given the task of arriving at an equitable solution to the proper management of water.

All farm organizations, cooperatives, local Lions, Kiwanis and Rotary Clubs, community clubs, the Dickinson County Community High School, Rural Center School, New Basel Church, Abilene Chamber of Commerce, Dickinson County Teachers' Association, bankers, businesses and thousands of individuals in Dickinson County support the conservation watershed approach to the water problem. There is no organization in Dickinson County opposed to the conservation watershed approach to the problem of water management. Time must be given to complete the program of conservation development. The hearty manner in which our farmers have supported the conservation work is sufficient evidence not only of a concern for the problem facing both city and country, but evidence of their desire to reach an equitable solution.

We know from engineering studies that have been made that our watershed program is designed to give a dependable supply of water and to hold runoff water to bank-full level of the streams. It was not until 1903 that a serious flood occurred on Turkey Creek according to Leonard Hoffman (1875–1959) who spent his life along the stream. We realize the necessity of more grass and trees and a proper management of the soil in order to return the area to its pre-1903 fertility and stability not only for our good but for the benefit of our civilization.

As a student of history I know of 21 major civilizations which have fallen as a result of mismanagement of natural resources and the mistake of one individual or agency "calling the shots" for all members of the society. Before agricultural lands are taken from use by reservoirs, we must consider all aspects of the problem for the good of posterity.

A conservation program will not remove a single site where dams could be built. Watershed development has proved big dams unnecessary in agricultural areas. In our program we are not dealing with today only but with matters which will increasingly concern America. Homer Hoffman, former Dickinson County Representative, reported that information was made available to Kansas House to the effect that 1,300,000 acres per year of American soil are taken out of production by highways, reservoirs, homebuilding, and the like. 400,000 acres of soil are lost by erosion per year. With our population increasing 7,000 per day, it is needful that we restudy the solution to management of natural resources. Our regard for future generations will not permit us to take any prejudiced view with reference to natural-resource management. We should give sufficient time to programs such as the Department of Agriculture considers valid for agricultural land and arrive at solutions which benefit city and country.

Conservation watershed development has proved itself both in the matter of flood reduction and care of natural resources. Dickinson County is alerted to flood problems involved and wishes to join forces with Federal agencies through Public Law 566 to arrive at a solution. Conservation work done on Turkey Creek organized 1959 under Kansas district law is evidence sufficient of our desire to reach a just and durable solution for proper care of natural and human resources.

REV. M. F. LICHTE,
Member Steering Committee, Turkey Creek Watershed, Elmo, Kans.

STATEMENT BY HUMBOLDT, CLARK'S CREEK AND LYONS CREEK WATERSHED DISTRICTS

We, the chairmen, of the Humboldt Watershed Joint District No. 12, the Clark's Creek Joint Watershed District, and the Lyon's Creek Joint Watershed District hereby jointly and respectfully submit the following statement to the appropriate Committee of the U.S. Senate concerning water resources in Kansas.

1. The Humboldt Watershed Joint District No. 12 has completed its organization under the Kansas Watershed District Act in every respect and has made application for Federal assistance under the Federal Watershed Protection and Flood Prevention Act, of 1954, as amended, commonly known as the "Hope-Aiken Act". This application has been pending before the Kansas Governor's Watershed Review Committee for approval of planning funds for more than 1 year and thus far without any indication whatsoever of possible availability of planning funds, and accordingly it will continue to be stalemated until such planning funds are made available. This watershed district has the almost unanimous support of the entire populace of its district which consists of 30,000 acres of land in Geary and Morris Counties. It, likewise, has the support of the Junction City Chamber of Commerce.

2. The Clark's Creek Watershed District which is situated in Riley, Geary, and Morris Counties, Kans., and which consists of approximately 210,000 acres of land, is now in the process of organization under the Kansas Watershed District Act. It will in the near future make application for Federal assistance under the Watershed Protection and Flood Prevention Act. Petitions have been drafted and reproduced for distribution to various members of the organizational committee for circulation in the district. A substantial committee of landowners has been organized and working for the formation of this watershed district for 8 years. Its organization is strongly favored by its rural residents and the citizens of the cities in the district.

3. Lyons Creek Watershed District, consisting of approximately 190,000 acres of land, is situated in Geary, Dickinson, Morris, and Marion Counties, Kans. Its directors have prepared, distributed, and have circulated their organizational petitions under the Kansas Watershed Act and will soon file these petitions with the Secretary of the State of Kansas for formal organization of this district. An organization has been working for the formation of this watershed district for approximately 18 months.

4. We respectfully invite the attention of the U.S. Senate and appropriate committees thereof to the urgent need for the following legislative changes which are urgently needed to overcome presently existing obstacles to the successful and reasonably expedient development of watershed programs which were contemplated and encouraged by the Federal Watershed Protection and Flood Prevention Act:

(*a*) Some provisions should be made to make Federal funds available to watershed districts for the acquisition of necessary lands, easements, or rights-of-way which are or will be needed in these watersheds as construction sites for watershed works of improvement.

(*b*) Federal engineering and technical planning assistance funds should be made available to watersheds to unlock the present stalemate being caused by its absence and to enable watersheds or the Secretary of Agriculture to employ private engineering firms on a contract basis for preparation of necessary engineering plans for works of improvement and in order to expedite the completion of the required soil conservation work. The Soil Conservation Service engineering staff presently has neither the adequate professional staff nor funds necessary to accomplish sufficient engineering for the watershed programs in the reasonable foreseeable future. The lack of these engineering funds and other problems now constitute an effective constructive veto of the Watershed Protection and Flood Protection Act.

(*c*) The Soil Conservation Service should be furnished with additional personnel and funds for the completion of present hopelessly backlogged soil conservation farm plans and practices which are being indefinitely delayed by lack of the same. This is another obstacle to the watershed districts which makes it difficult and unduly time consuming to meet the required percentage of recommended soil conservation measures and proper farm plans from farm owners of the lands situated in the drainage areas above each retention reservoir sought to be installed with Federal assistance by the watershed district. The watersheds cannot possibly function expeditiously until this obstacle is removed.

(*d*) Watershed districts should be permitted to claim the broad benefits contemplated by Congress for works of improvements as far downstream below the improvements as such benefits can be identified to the same extent as any other Federal agency constructing flood prevention structures with Federal funds is permitted to claim such identifiable benefits. Watersheds are presently not permitted to claim identifiable benefits below the mouth of the main stream on which the improvements or dams are constructed. This position should be liberalized to compare with the position on the same basic point of the Corps of Army Engineers for the reason that the Corps of Engineers is permitted to claim and does claim identifiable benefits of its structures on Kansas streams as far downstream below such structures as New Orleans. We believe that fundamental justice and fairness require that the same criteria for claiming benefits for flood protection and water-conservation improvements should be made mandatorily uniform by Federal legislation as to all such Federal agencies.

(*e*) In creek watersheds, such as the ones we represent, where watershed districts are organized and are progressing satisfactorily and where large reservoirs have also been recommended for construction by the Corps of Army Engineers, immediate legislation is needed to clearly define the point of progress or development of one project or the other beyond which the lesser developed project will not be further approved so that Federal funds will be neither wasted nor duplicated.

5. We feel that the above suggestions are in keeping with the best interests and general welfare of our Nation which could not now be better expressed by us than by calling attention to the previously recorded expressions of our President. In spite of the agricultural surplus problem at the present time, "in the long run, we shall need to give increased attention to the improvement and reclamation of land in its broadest aspects, including soil productivity, irrigation, drainage, and the replenishing of ground-water reserves, if we are adequately to feed and clothe our people, to provide gainful employment, and to continue to improve our standard of living.

"It is fortunate that today there is a growing recognition on the part of land users and the public generally of the need to strengthen conservation in our upstream watersheds and to minimize flood damage. Inadequate conservation measures and unsound land-use patterns vastly increase the danger of loss of valuable topsoil from wind erosion in time of subnormal rainfall and from water erosion in time of floods.

"This should be done as an integral part of our total flood-control and water-use program. In our past efforts to better utilize our water resources, to control floods and to prevent loss of life and property, we have made large investments on the major waterways of the Nation. Yet we have tended to neglect the serious waste involved in the loss of topsoil from the Nation's farms and the clogging of our streams and channels which results from erosion on the upper reaches of the small streams and tributaries of the Nation's rivers."

(A message dated July 31, 1953, from President Dwight D. Eisenhower to the Congress of the United States; H. Doc. No. 221, 83d Cong., 1st sess.)

Respectfully submitted.

HUMBOLDT WATERSHED JOINT DISTRICT, No. 12,
By C. L. STEINFORT, *Chairman.*
CLARK'S CREEK JOINT WATERSHED DISTRICT,
By PERRY V. SAFFELL, *Chairman.*
LYONS CREEK JOINT WATERSHED DISTRICT,
By HAYES B. BECK, *Chairman.*

STATEMENT BY EDNA R. AKINS AND FRANK AKINS

We, the undersigned landowners and taxpayers of the Turkey Creek Watershed, Newburn Township, Dickinson County, Kans., feel that we are justified in asking revised legislation, whereby developing of said watershed can be expanded more rapidly.

The dark cloud of the proposed big flood control dams is slowing down all community progress in all areas where these dams are threatening to take out of production the most fertile land of our Nation. This threat is taking its toll each day, not only in the progress of our community, but throughout the entire State and Nation.

Mr. ENGLE. Thank you.

I represent the formal and informal watersheds of the Kansas River, from Abilene to Lawrence, Kans.

The counties directly involved are the following:

Dickinson, Clay, Geary, Riley, Marion, Morris, Pottawatomie, Wabunsee, Douglas, Ottawa, Cloud, and parts of Shawnee and Jefferson.

Geographically, this represents over 10 percent of the State of Kansas.

We have the support of all the major farm organizations and many chambers of commerce, church groups, civic organizations, and most of the people that have heard the whole story.

We urge the speedy development of the watersheds of these areas and the elimination of any roadblocks which could hinder the full development of these projects.

The problems that watersheds have in the organization of a formal watershed under the Hope-Aiken Act, passed by our Congress, are multiple, but the results that can be expected from such an organization will be of much benefit to future generations.

The watersheds in the area named are small watersheds which can qualify for Federal aid under provisions of the Hope-Aiken Act.

These watersheds, when completed, will give agriculture, industry, and the people downstream, the flood control and stabilized stream flow for the future.

Pilot watersheds in Kansas and other States, have proven their value in flood control and in a stream stabilization. Watershed people want time to prove the value of their program.

We believe that priority should be given watersheds in areas where flood plans are restricted and benefits limited.

I thank you.

Mr. ELROD. The next witness is Thad Kinnaman, from Cedar Vale, Kans., chairman of the Watershed Committee of Kansas Association of Soil Conservation Districts.

Senator SCHOEPPEL. We are glad to have you with us today, Thad.

STATEMENT OF THAD KINNAMAN, CEDAR VALE, KANS., CHAIRMAN, WATERSHED COMMITTEE, KANSAS ASSOCIATION OF SOIL CONSERVATION DISTRICTS

Mr. KINNAMAN. Thank you, Senator Schoeppel.

May I call your attention to existing practices in coastal locations in connection with multipurpose structures under Public Law 566. Can you see them already on the table.

This is to represent a small valley upstream at about the point where a creek becomes big enough to be given a name, and where there is a suitable site available for construction of the structure.

We put the dam in the valley. There will be included in the design of that structure a sediment pool and the remaining volume behind the structure is available for flood detention.

If it is desired to also include more water for conservation purposes for use this would be clear water, useful water.

Of course, the flood detention volume has been decreased and it is necessary to increase the size of the dam proportionately.

Public Law 566 says that any part of the cost applicable to flood prevention will be borne by the Federal Government. Therefore, the local people assume that they will only be required to bear the cost or share in the cost of the additional part of the structure.

In practice, under the existing formulas they are required not only to pay for the additional cost, but also to share in a sizable chunk of the basic structure.

If this could be corrected, there will be a great deal more incentive for water conservation by means of multipurpose structures under the watershed program.

Senator SCHOEPPEL. You think, then, that that is a weakness in the law that should be corrected?

Mr. KINNAMAN. As I understand the Senator, it would not require legislation nor any further appropriations.

Senator SCHOEPPEL. Would it be by administrative——

Mr. KINNAMAN. It would be within agency policies. This is required as I understand it, by a directive of the Bureau of the Budget which was designated A–47.

Senator SCHOEPPEL. I remember.

Mr. KINNAMAN. Thank you.

Senator SCHOEPPEL. Thank you, Mr. Kinnaman.

Mr. ELROD. In the interest of saving time for this committee, and we appreciate the time that you have given us, Gen. A. D. Warnock, of Atchison, Kans., has prepared a statement. He is president of

the White Clay, Brewery, Whiskey Watershed District, and also Cecil Farthing, president of the Verdigris Water District.

They have both prepared statements which they have given to the staff, and we wish that they be included in the record.

Senator SCHOEPPEL. Let the record show they will be included and become a part of the official record of these proceedings.

(The statements referred to follow:)

STATEMENT OF WHITE CLAY-WHISKEY-BREWERY CREEKS WATERSHED DISTRICT NO. 26, ATCHISON COUNTY, KANSAS, A. D. WARNOCK, PRESIDENT

1. The city of Atchison is located on the right bank of the Missouri River at approximately mile 434.5 where the White Clay Creek cuts through the Missouri River Bluff and gives a reasonable grade to the west. It is the site of a highway and a railroad bridge crossing the Missouri River. It is served by the main line of the Missouri Pacific Railroad from Kansas City to Omaha, by the Santa Fe from Topeka to St. Joseph and Henrietta and by spurs of the Rock Island and Burlington Railroads. It is a milling, grain storage and manufacturing center. The main industry is the Locomotive Finished Materials Division of the Rockwell Manufacturing Co., which is in the flood plain of both White Clay Creek and the Missouri River.

2. In the month of July 1958, three floods on White Clay Creek occurred within a very short space of time. One, July 11, caused an estimated peak discharge of 20,000 cubic feet per second to be imposed upon a conduit capable of one-fourth that capacity. Three people lost their lives in this flood. Three others were seriously injured. The municipal water pumping plant was out of service 3 days; railroad service was disrupted for a longer period; 204 places of business, including the locomotive finished materials division were seriously damaged. The railroads suffered damage to tracks, facilities, and rolling stock. Goods in transit in 51 cars were partially destroyed. On July 14, a second minor flood occurred causing little damage. A third flood July 30 did not cause the damage that it would have caused had rehabilitation and restocking been completed after the first flood. The area was declared by President Eisenhower to be a disaster area. Damage in the first instance was approximately $3,600,000 and in the second was approximately $500,000.

3. Immediately after the occurrence of these disasters, steps were taken by all the interests affected to prevent a reoccurrence of these disasters. Every available means was sought and is being sought to protect this area from floods. Planning assistance from the Soil Conservation Service, Department of Agriculture was requested by the group which eventually formed this watershed district. During the late summer and fall of 1958, petitions were circulated to organize a watershed district under Kansas law. Rather than being delayed by calling an election, the watershed sponsors obtained the signatures of over one-half of the landowners within the watershed area, which number approximated 3,500. It was decided to include the urban area in the watershed for several reasons, even though this compounded greatly the problem of obtaining signatures. Planning assistance was granted in March 1959. When the Soil Conservation Service Watershed Planning Party was handicapped for lack of personnel, the district appropriated approximately $2,000 to give additional planning assistance to the Soil Conservation Service. A general work plan was finally submitted to the district in September 1959. Approval of the plan by the water resources division, State board of agriculture was obtained on October 19. Proper notice was given to landowners and electors. No written protest was filed and on November 10 the general work plan was finally approved by the district board. This work plan will become the official plan of the district unless 700 signatures of landowners in the watershed are obtained protesting adoption by the fourth week in December. It appears to be beyond the realm of possibility that any such petition will be circulated, let alone obtain the necessary signatures.

The work plan provides for the construction of 26 dams which will impound water falling on 65 percent of the watershed area. These dams supplemented by a cleared "flow way" created within the city of Atchison and other approved measures will materially reduce the flood damage caused by storms of the intensity of the highest ever recorded in this vicinity.

4. The district has been informed by the Soil Conservation Service that the following steps must be accomplished before earth is turned: Simultaneous review by the Corps of Engineers, U.S. Army; Department of Interior; and Gover-

nor of the State of Kansas. Transmission of the plan by the Department of Agriculture to the Bureau of the Budget. Submission to the appropriate committees of the Senate and House of the U.S. Congress. Passage of committee resolutions authorizing the project. Authorization by the Department of Agriculture for the expenditure of technical assistance funds. Preparation of detailed plans. Authorization for new start authority under budgetary restrictions.

The district has been informed that this procedure will require in excess of some 200 days.

Of particular cause for concern to the district is the question whether new start authority can be granted to the project which this district wishes to undertake at the time that that point is reached in the planning. We have been informed that 40 new starts for watershed proposals were authorized for fiscal 1960, that 12 of these had been granted by the middle of September, and that some 94 requests for new starts are anticipated during the remainder of fiscal 1960 and possibly the early part of fiscal 1961. How many new starts the 1961 appropriation bill will allow is unknown. It is apparent that the district is extremely interested in the number of new starts which will be authorized for fiscal 1961.

5. In connection with the administration of the Watershed Protection and Flood Prevention Act, we endorse the amendment (H.R. 4866, 1st sess., 86th Cong.) introduced by the Honorable William D. Mills, Representative from Arkansas. This bill would permit the Secretary of Agriculture to contract for the construction of works of improvement upon request of local organizations. The governing body of most watershed districts is not skilled in public administration. The members serve without compensation. By eliminating the time required to learn the technique of contract administration and to supervise construction, the governing body will be saved one of its most demanding and least rewarding "chores."

H.R. 4866 is considered a minor, logical, and highly desired extension of technical assistance now rendered to local organizations by the Department of Agriculture. We urge the select committee to report favorably upon H.R. 4866.

6. It is quite likely that this watershed district will undertake and officially request only the project which is contemplated in the general work plan under date of September 1959, however, it should be recognized that watershed districts are not limited to this type of development, construction, or improvement. The watershed district is vitally interested in many other matters which involve our water resources. The general work plan which has been approved by the district will not give a total flood protection for the property located within the district. This can only be obtained through channel improvement in the main stem of White Clay and possibly Brewery Creeks. The district is vitally interested also in all matters which affect the water resources and particularly those in connection with the Missouri River which forms the eastern boundary of the watershed district. In addition to these general interests, the district is vitally interested in all matters which affect the economy of the district which is comprised primarily of the city of Atchison. The ability of the district to bear its share of the cost of the watershed project in contemplation is going to be directly influenced by the ability of this area to maintain its present economy. Much of this is dependent upon the quality, volume, and control of the waters of the Missouri River. Its main industry is located not only in the flood plain of White Clay Creek, but also of the Missouri River. Channel improvement of the Missouri is important, navigational use is important, and adequate water supply for present and expanding needs is important. Pollution abatement is important. In this connection it should be noted that the city of Atchison has already taken the preliminary steps toward a project of sewage treatment, but the communities in Missouri, Nebraska, and Iowa which pollute the water that comprises the water supply of the city of Atchison have done little or nothing toward this end.

7. Summary: We urge the select committee to—

(*a*) Recommend adequate financial support for the Watershed Protection and Flood Prevention Act (Public Law 566) to the end that approved projects will not be delayed for lack of funds.

(*b*) Endorse H.R. 4866—an amendment to Public Law 566 permitting the Secretary of Agriculture to contract for the construction of works of improvement upon request of local organizations.

(*c*) Support the further development of the Missouri River project by channel improvement, agricultural levees, increased storage of water for navigation, irrigation, and power and measures designed to control pollution.

(*d*) Support the premise that the best control over water is by its impoundment near the source and its controlled release based upon downstream needs.

Respectfully submitted.

WHITE CLAY-BREWERY-WHISKEY CREEKS,
WATERSHED DISTRICT NO. 26,
Atchison County, Kans.

[SEAL]
Attest:

A. D. WARNOCK, *President.*
GEORGE ED KERFORD, *Secretary.*
JOHN S. MAY, *Attorney for District.*

STATEMENT OF CECIL FARTHING, PRESIDENT OF THE UPPER VERDIGRIS WATERSHED DISTRICT IN KANSAS

OLPE, KANS., *November 14, 1959.*

Mr. HOWARD ELROD,
Kansas Soil Conservation Commission,
Topeka, Kans.

DEAR SIR: A letter was received from Senator Andrew F. Schoeppel concerning the hearing of the Select Committee on National Water Resources of the U.S. Senate asking for a report from the Upper Verdigris Watershed District. This district consists of 210,860 acres located in Case, Lyon, Greenwood, Coffey, and Woodson Counties. Since 79 percent of the area is grassland, it is the vulnerable cropland which shows the vital need for flood protection. After the Soil Conservation Office at Lincoln, Nebr., rejected the general work plan, it was revised and accepted by the board of directors of the watershed district. At the end of the 40-day approval period, the final work plan will be sent to the National Soil Conservation Office in Washington, D.C., about December 1, 1959.

The board of directors is satisfied with the present plan and hope that Congress will appropriate the necessary funds next year to enable the final plan to be completed, thus eliminating the flood damages, as to the future water storage problem there is the existing situation of the small towns of Madison and Olpe not having adequate future water supply. Due to the present government cost-sharing plan providing insufficient assistance for construction of additional water storage for all small towns, Madison and Olpe will not be able to take advantage of it at the present time.

Our approved plan has 42 detention dams with only 5 structures to be operated with water at the crest of the principal spillway water level in other structures will be adjusted to eliminate the need for riprap for slope protection. This cuts the water storage in approximately 30 structures. The board of directors felt this water storage could have been maintained for future use with only small additional cost. Our cost ratio is 1.0 cost for 1.5 benefit.

I hope this has presented general information of our Upper Verdigris watershed plan with respect to the water problem in Kansas and its relation to an overall national water policy. Since the Upper Verdigris district in Kansas is to be one of the watershed districts to ask for appropriations from Congress in 1960, we will appreciate any assistance your committee can give.

Sincerely yours,

CECIL FARTHING,
Upper Verdigris Watershed Joint District No. 24.

Mr. ELROD. That completes the witnesses, Senator, and we thank you very much for the time the committee has given us.

Senator SCHOEPPEL. Thank you, gentlemen.

The next group we will hear from is the irrigation group. The coordinator is Jack Nicholson, of Ellis, Kans., president of the Kansas Reclamation Association.

Jack, we are glad to have you here with your folks representing your association.

STATEMENT OF JACK R. NICHOLSON, ELLIS, KANS., PRESIDENT, KANSAS RECLAMATION ASSOCIATION

Mr. NICHOLSON. Thank you, Senator Schoeppel.

Senator SCHOEPPEL. You may proceed, sir.

Mr. NICHOLSON. Senator Schoeppel, I have a statement here which I wish to read.

Senator SCHOEPPEL. You may proceed, sir.

Mr. NICHOLSON. My name is Jack R. Nicholson. I was born in Ellis, Kans., and have lived there almost continuously for 48 years.

I am making this statement in regard to irrigation needs for the Kansas Reclamation Association, of which I am president.

The Kansas Reclamation Association was organized in 1938. It is a nonprofit organization dedicated to the stabilization of agriculture by flood control, irrigation, and soil and water conservation.

The members of our organization believe the control and beneficial use of the water that falls on, flows into, and lies beneath the surface of our land, is the greatest single factor in the future prosperity and well being of the people of Kansas.

Much has been accomplished in the last 20 years in the fields of flood control and beneficial use of our water resources in Kansas, but there remains much more to be done if the Bureau of Census is correct with their projection into the future on population trend.

We believe this can be best accomplished by a united effort from the local, State, and national level.

We wish to present our policy for the future in the following seven points:

1. RESPONSIBILITY

The investigation, planning and construction of most of the major flood control and multiple-purpose projects in Kansas have been done by the U.S. Corps of Engineers, the U.S. Bureau of Reclamation, and the Soil Conservation Service of the U.S. Department of Agriculture.

These Federal agencies have coordinated planning and work among themselves and other State and Federal agencies such as our water resources board, Division of Water Resources of the Kansas State Board of Agriculture, Kansas State Board of Health, State geological survey, U.S. Geological Survey, and the Federal Fish and Wildlife Commission.

The coordinated planning has been accomplished by the interagency basin committees which have representation from both the Federal and State agencies.

We believe this system has worked very well in the past and is in accord with our democratic form of government.

Under this democratic process we are operating irrigation districts successfully. We believe that improvements could and should be made in this system, such as the standardization of methods used by the various agencies in evaluating benefits.

We look with great caution on the proposed idea of regional commissions to administer our water program, believing that they would,

in effect, set up an additional unneeded unit of government, and would endanger the sovereignty of our States and the rights and duties which belong to the Congress of the United States.

2. STATE WATER RIGHTS

In order that the control and beneficial use of water can proceed in an expeditious and orderly way, we believe the user who contracts for the water and who makes capital investments depending on the use of same should have an unconditional right to the use of the water if it is available to him on the basis of his priority.

We believe the granting of water rights belongs to the several States and we, therefore, confirm with and affirm the action of the House of Representatives of the State of Kansas, the Senate concurring therein, that the Congress and the President of the United States and the Representatives of Kansas in the Congress of the United States be, and they are hereby respectfully urged and requested to take 11 necessary actions to:

A. Preserve the water rights of the individual and the States, and to prevent Federal usurpation of those rights;

B. To see that legislation is initiated and supported to reestablish to the individuals and to the States, the rights taken from them by the Federal courts and the Justice Department;

C. In every way possible reaffirm, renew and defend the concepts that water rights are property rights and that these established rights to the use of water, by a State or individual, should not be taken away without due process of law and adequate compensation.

3. RECOGNITION OF FUTURE NEEDS IN CONSTRUCTION OF PROJECTS

By general survey the Kansas Board of Water Resources has definitely shown that growth and prosperity in Kansas depend on available future water supply.

In order to store and use for beneficial purposes all surface water available, and as the location sites for large storage reservoirs are limited, we believe that anticipated future needs for water, as well as present needs, should be recognized by the people residing in the areas which could benefit, and that the people in these areas insure their future needs in planning and construction as set forth in the Federal Water Supply Act of 1958, title 3 of the omnibus bill.

4. CONSERVATION OF GROUND WATER SUPPLIES

Recognizing that in Kansas our largest present source of usable water is ground water and that the recharging of underground water reservoirs is a very slow process, we recommend the control, storage, and use of all surface waters to the fullest extent possible in order to eliminate any unnecessary use of ground water supplies.

This should include land treatment by contouring, terracing, reseeding of marginal land back to grass and grassland management, then continue to small storage and silt retaining structures, then to the medium sized multiple use reservoirs, and finally, to the large multiple use reservoirs.

5. SUGGESTED CHANGE IN POLICY OF THE SOIL CONSERVATION SERVICE

In accordance with the recommendation in item 4, we recommend that the Soil Conservation Service of the U.S. Department of Agriculture should recognize the storage and use of water to be equally, if not more important, than flood control in their watershed program.

6. ACCELERATION OF GROUND WATER EXPLORATION AND WATERSHED PROGRAM

The ground water exploration program is being conducted in Kansas under matched Federal and State funds by the U.S. Geological Survey and the State geological survey.

As full information on ground water supplies at an early date is extremely essential for the well-being and economic progress of the people of this State, and as full exploration at the present rate permitted by available funds will take many years to complete, we recommend that both Federal and State funds for this program be increased to the extent that this very important program may be completed at the earliest possible date.

We also recommend that adequate funds for joint investigation and planning of watershed projects be provided by the State and Federal Governments.

7. URGING LEGISLATION TO PERMIT THE BUREAU OF RECLAMATION TO ALLOCATE JOINT RESERVOIR COSTS TO RECREATION AND TO CONSTRUCT BASIC RECREATIONAL FACILITIES ON A NONREIMBURSABLE BASIS

Recognizing that opportunities for healthful and wholesome recreation are beneficial to our people and that multiple purpose reservoirs constructed by the Bureau of Reclamation create centers for a wide range of recreational activities;

That under present law there is no provision for allocating any part of the joint costs of Bureau of Reclamation projects to recreation;

We recommend that the Congress authorize the Secretary of the Interior to construct such basic recreational facilities as required to permit and facilitate eventual maximum recreational use of Bureau of Reclamation reservoirs and that funds so expended be classed as nonreimbursable.

I wish to include as part of this statement a copy of the resolutions adopted by the Kansas Reclamation Association at its 20th annual meeting at Norton, Kans., on October 9, 1959, and appended thereto.

Senator SCHOEPPEL. A copy of the resolutions which you refer to will become a part of the official record here.

(The resolution referred to follows:)

THE KANSAS RECLAMATION ASSOCIATION RESOLUTIONS ADOPTED AT THE 20TH ANNUAL MEETING

1. Whereas the Bureau of Reclamation and the U.S. Corps of Engineers have, under the Pick-Sloan plan for the development of the Missouri River Basin, investigated and recommended several projects in the State of Kansas for the purpose of flood control, stabilization of agriculture through irrigation, and to provide needed water for domestic, municipal, and industrial use; and

Whereas these projects have been authorized by Congress: Now, therefore, be it

Resolved, That this association recommend that the investigation, planning, and construction be accelerated to the end that the completion of these plans be accomplished at the earliest possible date.

2. Whereas the economy of the Western States depends on the control and use of water for irrigation and whereas, since the beginning of the development of the West it has been generally recognized by administrative officials and courts of law that the water rights belong to the several States: Be it

Resolved, That this association concur with and affirm action by the House of Representatives of the State of Kansas, the senate concurring therein, that the Congress and the President of the United States and the representatives of Kansas in the Congress of the United States be, and they are hereby, respectfully urged and requested to take all necessary action to—

1. Preserve the water rights of the individual and the States and to prevent Federal usurpation of those rights.

2. To see that legislation is initiated and supported to reestablish to the individuals and to the States the rights taken from them by the Federal courts and the Justice Department.

3. In every way possible reaffirm, renew, and defend the concepts that water rights are property rights and that these established rights to the use of water, by a State or an individual, should not be taken away without due process of law and adequate compensation.

3. Whereas the U.S. Bureau of Reclamation has completed plans for the Norton-Almena project on Prairie Dog Creek, an irrigation district has been organized, and its board of directors has contracted with the United States for the delivery of water to the irrigable lands in the district; and

Whereas the proposed project will prevent the recurrence of disastrous flood damage and provide needed domestic water for the Norton community;

Whereas the city of Norton has contracted for domestic water with the United States, this association urges that funds for the construction of this authorized project be included in the 1961 Federal budget.

4. Whereas a disastrous flood occurred on Big Creek on June 16, 1957, which resulted in the loss of several lives and direct damage to property of more than $3 million to the cities of Ellis and Hays and surrounding rural areas; and

Whereas a similar flood occurred in 1951 which likewise resulted in the loss of several lives and great destruction of property: Now be it

Resolved, That this association urges the investigation by the appropriate Federal and State agencies to determine feasible plans to prevent future flood disaster and that Federal funds for such investigation be included in the 1961 budget.

5. Whereas the Bureau of Reclamation is investigating Glen Elder Reservoir and irrigation project;

Whereas this reservoir is urgently needed to control floods not only on the Solomon but Kaw River as well to stabilize the economy of the Solomon River Valley by irrigation of agricultural products and to provide urgently needed municipal water to the city of Beloit; and

Whereas the investigations by the Bureau of Reclamation are progressing at a low rate not commensurate with the importance of this project to the State of Kansas; Be it therefore

Resolved, The Bureau be urged to allocate sufficient funds in 1961 for completing its report in that year so initiation of construction may be requested for 1962.

6. Whereas the U.S. Bureau of Reclamation has completed a feasibility report regarding the Cheney division Wichita project (Kansas), commonly called the Cheney Reservoir located on the north fork of the Ninnescah River; and

Whereas this project has been approved overwhelmingly at the polls in the city of Wichita and has met with the favorable comments of the Federal and State agencies concerned; and

Whereas this project envisions flood control, irrigation, fish and wildlife, municipal supply, and recreational benefits; and

Whereas a proposed contract has been negotiated between the city of Wichita and the United States providing for the repayment to the Federal Government of that portion of the project cost allocated to municipal water supply; and

Whereas separate bills have been introduced in the U.S. Congress, namely H.R. 4606 and S. 1092: Be it therefore

Resolved by this association, That the beforementioned proposed legislation be met with favor in the U.S. Congress and that funds be appropriated to initiate the construction of this worthwhile project.

7. The Kansas Reclamation Association reaffirms its opposition to a Missouri Valley Authority.

8. Whereas the U.S. Bureau of Reclamation is authorized to plan for and cooperate in construction of recreational areas at its reservoir sites, but is not permitted under Federal reclamation laws to operate recreational facilities: Now, therefore, this association commends the Kansas Park and Resources Authority and the Kansas Forestry, Fish, and Game Commission for the cooperation with various Federal agencies in the development of such areas for recreational use by the general public and urges continuation of this development.

9. Urging legislation to permit the Bureau of Reclamation to allocate joint reservoir costs to recreation and to construct basic recreational facilities on a nonreimbursable basis.

Whereas one of the products of the technological advances of modern society is the gradual extension of leisure time; and

Whereas it is a matter of national concern that such leisure time be provided healthful outlets; and

Whereas multiple-purpose reservoirs constructed by the Bureau of Reclamation create centers for a wide range of recreational activities, including fishing, hunting, boating, swimming, water skiing, and picnicking; and

Whereas although recreation is served by creation of these manmade lakes, there is no provision for allocating any part of the joint costs to recreation; and

Whereas present scale construction of minimum basic facilities at Bureau of Reclamation reservoirs is purely a defensive program of "protecting the reservoir from the people and the people from the reservoir" and falls woefully short of being a positive program for enhancing recreation potentials of the reservoirs; and

Whereas this defensive and wholly inadequate policy of construction of recreational facilities is a result of existing authority which classifies any such investments as reimbursable and therefore repayable only by water and power users: Therefore be it

Resolved, That the Congress of the United States be urged to authorize the Secretary of the Interior to allocate joint reservoir costs to recreation to a degree commensurate with recreation benefits created by the reservoir and that such allocation be nonreimbursable; and be it further

Resolved, That the Congress of the United States be urged to authorize the Secretary of the Interior to construct such basic recreational facilities as required to permit and facilitate eventual maximum recreational use of the reservoirs and that funds so expended be nonreimbursable; and be it further

Resolved, That a copy of this resolution be sent to the National Reclamation Association for referral to its resolutions committee with the recommendation that a similar expression be registered by the national body, and that copies be sent to each member of the Kansas delegation in the Congress with the request that every effort be made to induce Congress to make the provisions stated herein.

10. This association heartily endorses the fine work which has been done in Kansas by the following agencies in the fields of flood control and conservation of water and soil:

U.S. Bureau of Reclamation.
U.S. Corps of Army Engineers.
Kansas State University, Manhattan.
Soil Conservation Service.
Water resources council of the Kansas State Chamber of Commerce.
The Republican Valley Conservation Association.
U.S. Geological Survey.
The State Geological Survey of the University of Kansas.
Kansas Water Resources Board.
Kansas Water Resources Division of Kansas State Board of Agriculture.
Kansas Industrial Development Commission.
The Missouri-Arkansas Flood Control Association.

11. This association extends its thanks to the city of Norton, the Norton Chamber of Commerce, 4–H Association, Dr. Stephenson, Elton Carter, and Keith Sebelius, and others who have extended such fine hospitality to the delegates of this 20th annual meeting of the Kansas Reclamation Association.

Senator SCHOEPPEL. Thank you for your statement, Jack.

Mr. NICHOLSON. Now, Senator Schoeppel, I would like to introduce Keith Sebelius, of Norton, Kans.

STATEMENT OF KEITH SEBELIUS, NORTON, KANS., ATTORNEY, CITY OF NORTON AND ALMENA IRRIGATION DISTRICT NO. 5

Mr. SEBELIUS. My name is Keith G. Sebelius. I was born in Almena, Norton County, Kans., on the banks of the Prairie Dog Creek, and have lived in western Kansas continuously, except for education and military service, all my life.

I am making this statement concerning the water needs and problems of Prairie Dog Creek as city attorney for Norton and Almena, Kans.; attorney for Almena Irrigation District No. 5; president of Norton Chamber of Commerce, and director of the Republican Valley Conservation Association.

Prairie Dog Creek starts in the flat prairie land of Thomas County in western Kansas and runs in a northeasterly direction for approximately 120 miles to a point a few miles across the Kansas line into Nebraska, where it empties into the Republican River.

It drains an area of approximately 1,800 square miles.

The eastern three-fourths of the area is quite rolling. The runoff is rapid and produces excessive flooding in the middle and lower valley.

This involves especially the towns and cities of Jennings, Clayton, Norton, State sanatorium for tuberculosis, Almena, and Long Island.

FLOOD CONTROL

The valley has four needs. Flood control, municipal water for the city of Norton, reclamation for a stable agricultural area, and recreation.

In 1953 the flooding of Prairie Dog Creek took our highway and railroad bridges on both sides of Norton. A survey that was certified by the Corps of Engineers showed a total damage from this one flood alone for utilities, highways, railroads, crops, and farm and town property, of $2,282,263.85.

The need for control of this stream has been apparent for many years. In 1944 the Geological Survey established a gaging station at Norton. Since that date this stream has exceeded flood stage 10 times. Flood stage is 18 feet.

In 1951 flood damage to the county road system alone in bridges, culverts, and fills, was $165,000, or more than $20 for every man, woman, and child in the county.

MUNICIPAL WATER FOR CITY OF NORTON

The city of Norton, Kans., is a town of 3,500 people, situated for the most part on the north bank of Prairie Dog Creek. The city is operating a system of 13 water wells on the second bottom of Prairie Dog Creek. The water table in these wells has dropped 15 feet in the past 6 years.

In 1956 the city issued $40,000 in emergency water bonds to help drill four new wells and enlarge collection mains.

On many occasions in the last 6 years there has been no water pressure in the north half of town, which is located on higher ground. There have been times when the hospital has had no water to flush stools, and fire hydrants, no water for firefighting.

The city has rationed water in 4 of the past 6 years. This year there was water rationing for 7 weeks.

The city of Norton entered into a repayment contract with the United States Government in March of 1958 to receive 1,600 acre-feet of water per year from Norton Reservoir, a part of the Almena project of the Bureau of Reclamation. If and when that reservoir is built the city should have adequate water still in year 2000.

RECLAMATION

Almena project of the Bureau of Reclamation was authorized by the Congress in 1944. It was found feasible in the spring of 1957.

Almena Irrigation District No. 5 was organized in 1957 and entered into a repayment contract with the U.S. Government in March of 1958. It will not only irrigate approximately 5,500 acres of land, but will afford stabilization to the area agriculture by assuring the farmer of feed and grain in the dry years.

RECREATION

Fishing and duck hunting are all but eliminated from Prairie Dog Creek because irrigation pumps are using all but flood waterflow. The nearest natural, State or Federal, bodies of water from the city of Norton, in the middle of the Prairie Dog Valley are Kirwin Reservoir, 49 miles; Harlan County Reservoir, 45 miles; and Webster Reservoir, 56 miles.

Control of future flooding of Prairie Dog Valley is a must in the area if it is to survive. The rapid expansion of irrigation wells pumping ground water will, within the next decade, create water problems for all communities in western Kansas who rely upon ground water for their municipal water supplies.

Irrigation will guarantee feed and grain for livestock in the area when there are dry years.

There is a great need to keep the youth of western Kansas on the plains. Outdoor recreation will help.

Thank you.

Senator SCHOEPPEL. I want to say we are deeply appreciative of your interest and we are happy to have you here.

Mr. SEBELIUS. Thank you, Senator.

Mr. NICHOLSON. Now, Senator Schoeppel, I would like to introduce Gerald Van Pelt, who has a very short statement to make and also a statement to file.

Senator SCHOEPPEL. We are glad to hear from you, Mr. Van Pelt.

STATEMENT OF GERALD VAN PELT, BELOIT, KANS., SOLOMON VALLEY WATER CONSERVATION AND FLOOD CONTROL ASSOCIATION

Mr. VAN PELT. Thank you, Senator Schoeppel.

I think also in the interest of time I will relinquish that because you will have a copy of this original statement, and I think you will understand the situation.

So since I represent the Solomon Valley Water Conservation and Flood Control Association, this will tell our story to you.

I submit these for your files.

Senator SCHOEPPEL. Thank you, and they will be received and become a part of the official records of the proceedings.

(The material referred to follows:)

SOLOMON VALLEY WATER CONSERVATION &
FLOOD CONTROL ASSOCIATION,
Beloit, Kans., November 14, 1959.

Hon. ROBERT S. KERR,
Chairman, Senate Select Committee on National Water Resources,
U.S. Senate, Washington, D.C.

DEAR SIR: We are vitally interested in the earliest possible completion of the authorized Glen Elder Dam and irrigation district here in the key lower sector of the Solomon Valley.

This project is part of the Pick-Sloan development plan. In the 1951 flood, the Solomon River was the worst offender in producing the tremendous load of downstream siltation and city damage in the Kaw Valley. According to data available from the Corp of Engineers, at least $17 million of the 1951 Kansas and Missouri River basin damage was traceable to the Solomon River. So first of all, we need the Glen Elder dam for flood control.

The city of Beloit with a population of 4,000 is entirely dependent upon the Solomon River for domestic water supply. We move from flooding on first and second bottom land to water rationing, due to extreme short supply, almost every summer at Beloit. Irrigation from the river is increasing each year causing a more critical Beloit water supply. Thus, we need the Glen Elder Dam to insure adequate domestic water for Beloit.

To insure our future growth and to aid in keeping our youth at home, we need to develop more irrigation to stabilize our agricultural economy. We are most vulnerable to boom and bust cycles due to our variable climatic conditions. Thus, we need the Glen Elder Dam to aid in economy stabilization.

We are asking for an appropriation of $500,000 for fiscal year 1961 to complete planning and start construction of the Glen Elder Dam.

Respectfully yours,

DEAN D. HADDOCK,
Treasurer, Executive Board.

STATEMENT OF SOLOMON VALLEY WATER CONSERVATION AND FLOOD CONTROL ASSOCIATION

The Solomon Valley Water Conservation and Flood Control Association was organized for the purpose of assisting in the realization of the benefits from the Glen Elder unit which was authorized by Congress by the Flood Control Act of 1944. Fifteen years have now elapsed since the area's needs of flood control, irrigation, and related benefits of conservation storage moved the Congress to include the unit as a part of the overall Missouri River Basin development.

Certainly nothing has occurred in the intervening decade and a half to diminish the needs recognized by Congress at the time of authorization. This is particularly true for this valley downstream from the proposed Glen Elder Dam and Reservoir which has experienced during this period not only five major floods, including the worst one (July 1951) in recent history, but also an extremely devastating and prolonged drouth (1953–56).

Tremendous damages resulting from floods in the Kansas River Basin clearly establish the need for further regulation of unrestrained river flows. Damages resulting from the 1951 flood alone were estimated to be $16 million along

the Solomon River. This estimate does not include the many times greater damages downstream in the Kansas River mainstem which were partly attributable to flooding on the Solomon River. It is the last link in the combination of three reservoirs, Kirwin, Webster, and Glen Elder, necessary to control a flood such as the 1951 flood on the Solomon River. Control of floods on the Solomon River is essential to the plan for giving flood protection to the lower Kaw, including Kansas City. It cannot be separated in importance from the other major Kansas River tributaries. The Corps of Engineers recognized the importance of regulating flows of the Solomon River when, following its analysis of the 1951 storms, it recommended a fourfold increase in flood control capacity for Glen Elder Dam. In any given year there is the lurking potential of a storm which could inflict damages in excess of the cost of Glen Elder Dam and Reservoir.

The maintenance of an adequate water supply for towns in the Solomon River Valley is an increasing problem. This situation has been particularly acute in the city of Beloit. The city is dependent on the Solomon River for its water supply. Several times during the last few years, the city has had to restrict the use of water to the bare necessities, and has had to appeal to the upstream irrigators to curtail stream pumping.

Beloit and other valley towns can well utilize an allocation of space in Glen Elder Reservoir for municipal water to meet an existing critical situation and to insure a water supply base for reasonable future expansion.

Construction of the Glen Elder unit will permit the transference of some 22,000 acres of land from a "boom or bust," largely one type crop farm economy, to a stable, diversified economy which will be beneficial not only locally, but to some degree regionally and nationally. As in other Great Plains areas, the climate which produces flooding rains, conversely deprives the area of moisture in critical crop-growing periods. Although dryland farming in the unit produces abundantly with adequate moisture, intermittent droughts and poor distribution of rainfall have impaired the predominantly agricultural economy and resulted in instability and insecurity. This has caused farm abandonment and migration. Irrigation will permit diversification in farm crops, provide a basis for balanced livestock programs, which will lend stability to the area.

For example, here is what the proposed development can do for Mitchell County, Kans. During the past decade (1949–58), Mitchell County has produced a yearly average of approximately 800,000 bushels of grain, mainly corn and grain sorghum, from 40,000 acres of land, about 20 bushels per acre. This production has ranged from 200,000 bushels in 1955 to 1,865,000 bushels in 1958, 3 years later, which indicates the difficulty of developing a stable livestock program on such a fluctuating feed-grain base.

The proposed Glen Elder project would bring irrigation to about 15,000 acres in Mitchell County, which can be devoted mostly to feed grains. It will yield 80 to 100 bushels per acre, and would produce annually about 1,350,000 bushels. This will more than double the present feed-grain base and assure the production each and every year of almost as much grain for Mitchell County as was harvested in 1958, the best year in the past decade. Much of this land which will be irrigated by the proposed project is now being used for production of wheat.

Such an adjustment would be advantageous nationally, as well as locally, since it would provide a shift from the present cropping of surplus wheat. The area cannot make this adjustment without the project, since quality and quantity of the groundwater in the Solomon Valley precludes significant development of irrigation by private wells.

We believe that irrigation offers the means of positive approach to the farm problem in the Great Plains. Admittedly, not on a large scale, since water supplies in Kansas are not unlimited, so only selected areas can be developed for irrigation. Nevertheless, these islands of irrigation will impart some degree of stability to a wide area of the surrounding dry-farm economy. Some people are prone to think that because the Nation is currently being troubled with farm surpluses, to maintain an abundance of food supplies in the United States is unsound. They draw the erroneous conclusion that to develop land and water resources further, and to assist farmers in changing to a less-hazardous type of farming is also an unsound policy. Such reasoning is shortsighted. It would lead eventually to less efficient production and weakening of our national economy.

This Nation has become the strongest nation economically in the world today. One of the reasons for this is our ability to produce an abundance of goods, including adequate food supplies for the whole population. Twice since the

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turn of the century, this country has fought in world conflicts, and during these critical periods the outcome has been to a large extent dependent on the ability to produce sufficient food for ourselves, our Armed Forces, and our allies.

This ability of the American farmer to produce abundantly did not come about by accident. It was the result of applying to our land resources a system of individual commercial farming, augmented by a Government policy which has fostered greater farming efficiency and greater diversification. This overall national policy, nearly 100 years old, has been implemented by our system of agricultural colleges, experiment stations, the county agents and extension services, and the Soil Conservation Service. Reclamation projects have also played a part in this policy by aiding agricultural development in the West.

This policy of promoting efficient agriculture has "paid off" in past years. The long-range outlook indicates that abundance of food will be needed in the future, and therefore we would be "pennywise and pound foolish" to abandon now this national policy of aiding farmers to develop land resources further and strive for more efficient production.

Another benefit from water resource developments such as Glen Elder unit is the opportunity for recreation which it creates. This is an item which, in the past, has been relegated to a purely incidental position. One of the phenomena of our society since World War II has been the explosive growth of investment in recreation, particularly in the forms utilizing bodies of water. The lack of such national lakes in the Great Plains permits multiple purpose reservoirs such as Glen Elder to provide very significant recreation resources.

We have noted with interest the progress of construction of the Missouri River Basin project since its authorization. We are glad to note that much of this great work has been completed, particularly on the mainstem. However, we do not want the progress on the more glamorous features of the project to blind everyone to the fact that elements of the plan, like Glen Elder unit, have seen little advancement since 1944. Perhaps we have been too passively waiting for the development to come to us, a position which has been mistakenly interpreted as a lack of local interest. On the contrary, the residents of the area have become more and more water conscious. A few years ago a group of leaders banded together as the Citizens for Glen Elder Dam in an effort to more effectively press for the area's needs. The activities of the group were noted by and gained the support of the Governor of Kansas, the Kansas Water Resources Board, and downstream municipal and industrial interests. To increase our effectiveness, we have recently broadened our representation, and formally organized as the Solomon Valley Water Conservation and Flood Control Association.

It is gratifying to us to know that water resources problems of the Nation are receiving the attention of this Senate select committee, and we want to thank you for the opportunity to place our views before you.

Mr. NICHOLSON. Now, Senator Schoeppel, I would like to introduce Dale Williams, Ulysses, Kans., president, Southwest Kansas Irrigation Association.

Senator SCHOEPPEL. Mr. Williams, we are glad to have you here.

STATEMENT OF DALE WILLIAMS, ULYSSES, KANS., PRESIDENT, SOUTHWEST KANSAS IRRIGATION ASSOCIATION

Mr. WILLIAMS. Senator Schoeppel, it is a pleasure being here and having an opportunity to appear before the U.S. Senate select committee.

The Southwest Kansas Irrigation Association is an incorporated organization whose territory includes the 14 southwest counties of Kansas, consisting of Greely, Wichita, Finney, Scott, Kearney, Hamilton, Stanton, Grant, Haskell, Gray, Meade, Seward, Stevens, and Morton Counties.

Within the area of our association the irrigated acres will amount to approximately one-half million acres.

I would like to expound on that if I may. The complete acreage including ditchdiggers, practically all of our irrigation within this area

is from underground sources. There is very little ditch water or surface irrigation from our river sources.

Within this acreage we have 627,952 acres being irrigated from 21,783 irrigation wells. That is roughly 320 acres per well.

Within the area of our association the number of irrigated acres has increased greatly within the last 10 years.

As an example of this, the Cimmaron unit, which is an area within the association area, which unit comprises all of Morton, Stevens, Seward, Stanton, Grant, and a portion of Hamilton, Kearney, Haskell, and Meade Counties, in 1949 had 40,000 acres under irrigation; in 1954 the acreage was 100,000 acres, and in 1959 it is 271,000 acres.

This acreage is increasing rapidly and has definitely stabilized the economy of our southwestern area.

Persons who have studied the process of irrigation in this area and the potential of acres to be irrigated are of the opinion that by the year 1980 the number of irrigation acres will double and the water consumption will double by 1980.

These figures we feel are very conservative.

However, should full irrigation practices come into being in our area with peak production seeking the very peak, our water consumption could normally triple.

However, should drought and adverse economic conditions develop as far as dryland farming is concerned, the development of irrigation in this area could reach an acreage in excess of 2 million acres under irrigation and assuming a total of 2 acre-feet of water were to be applied, water consumed for irrigation purposes would cause a demand in excess of 4 million acre-feet.

This raises, in the minds of those interested in the subject of irrigation, several important questions which should be considered at this time in order to plan for the future. These questions are as follows:

1. The extent to which the area can be developed, to serve the best interest of the area to a safe maximum.

2. Up to the present time, research in the area has been on a limited scale. Our association feels that an accelerated research program of ground water should determine as soon as possible, accurately, the extent to which the area could be developed.

This research would be beneficial both for those who contemplate irrigation as well as those presently engaged in irrigation.

3. Consideration should be given to recharge. Research should determine the actual amount of area receiving recharge.

This very important phase of irrigation is important because information received from other areas which have had irrigation longer than this area shows that recharge is now a very serious problem in those areas, and if the irrigation farmers of the area of our association were informed on the subject of recharge, the irrigation practices would probably be curtailed, or at least, present practices could be curbed in order to prevent the ultimate loss of water as well as the ultimate abandonment of some of the present irrigation systems.

4. Water, utilization and conservation, could be greatly improved as the result of proper research.

5. As a result of proper research, a change in crops, cropping procedures could be recommended for the benefit of the economic stabilization of this area.

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Research is needed concerning the adaptable crops suitable for the area economy.

6. The existing confusion concerning conservation practices among the various agencies must be abolished. Definite programs concerning the evaporation control should be outlined and adhered to and practices concerning evaporation control should be increased.

The use of underground pipe should be encouraged where long open ditches are necessary.

More thorough topographic mapping is desired in most areas of our association.

Possible and adequate information concerning ground water movements, its hydrographic facts must be determined before various agencies and individual farmers can make the various decisions confronting them concerning their ground water problems.

It is not anticipated by this association that industrial use of water will greatly increase in this area for the reason that there are no large centers of population in this area which are going to attract large industrial users.

However, we feel that large industrial users would require water in greater amounts than could be supplied from ground water sources.

Recreation needs are in demand throughout our area because of the present lack of their existence. Recreational facilities are definitely an asset to any area and in particular to the area of southwest Kansas because of the fact that there are a great number of people who would use such facilities and such facilities can also be used for conservation of water.

Thank you.

Senator SCHOEPPEL. Thank you for your statement and, Jack, for you and your group here we appreciate your time and your effort as we have of those who preceded you for coming in and getting these matters in this comprehensive record.

Mr. NICHOLSON. Thank you, Senator Schoeppel.

Senator SCHOEPPEL. Before we proceed to the next category, I want to make inquiry: Is Mr. Vanlandingham here?

He may come in later.

I am making inquiry this morning because I requested some information as to whether he was here because the Governor of Missouri indicated to us that Mr. Vanlandingham would represent the Governor of Missouri here in these proceedings today.

Now, we will proceed with the next category, the statements concerning the water and the public water supply.

The coordinator is Mr. A. E. Howse, of Wichita, Kans., former mayor of Wichita.

STATEMENT OF A. E. HOWSE, WICHITA, KANS.

Mr. HOWSE. Senator Schoeppel?

Senator SCHOEPPEL. Colonel Howse?

Mr. HOWSE. I would like, if I may, to turn the introduction over to the mayor of Wichita, Mr. Justus Fugate.

Senator SCHOEPPEL. We are glad to have you, Mr. Fugate, and will be glad to hear from you.

STATEMENT OF JUSTUS FUGATE, MAYOR, WICHITA, KANS.

Mr. FUGATE. Senator Schoeppel and our Congressman, if I may, the city of Wichita, in preparation for this hearing, held a meeting last week of a good many mayors of various cities of the State who have a very definite interest in the hearing here today.

The meeting was called on short notice, but it was well attended. Either the mayor or a representative of the mayor of Arkansas City, of Augusta, Chanute, Coffeyville, El Dorado, Hutchison, Junction City, Kansas City, McPherson, Marion, Parsons, Salina, Topeka, and Winfield, were present at that meeting.

After a presentation and a discussion, the matter was given the unanimous approval, and a statement which was presented at that meeting by Mr. Howse was unanimously approved by all of the mayors or their representatives present.

At this hearing we have some representatives of the cities who were present last week, also present here today.

I would like to present them to you at this time.

Senator SCHOEPPEL. We are glad to hear them.

Mr. FUGATE. We have from Topeka here, the mayor, Ed Camp, if he would please stand.

From the city of Hutchison, Mr. Jerry Stremel, mayor; its city manager, Mr. Boman and four others, if they would please stand.

From Chanute, Mr. Harold R. Williams, the mayor, and four others, all of the civic commission and the city manager.

We also have Melvin Carrico, mayor of Beloit, who has examined and read the statement to be presented here and has given it his approval.

We have also Jay Hargett, city attorney of Marion, and a representative of the mayor of the city of Marion.

The others whom I am not sure are here, Mr. Thomas Fegan, mayor of Junction City.

Mr. Bernard Budd, the city manager of Parsons, and representing the mayor of Parsons.

Jack Welfeldt, mayor of Winfield.

K. F. Sanborn, city manager of Augusta and representing the mayor of Augusta.

And also Mr. Murray Wilson, of Salina, the acting mayor of the city of Salina, who will appear later in this connection.

These gentlemen are here to indicate their approval of the position to be presented to you by our former mayor of Wichita, Mr. A. E. Howse.

We are pleased that the presentation which Mr. Howse will make to you has received the unanimous approval of the various cities and their representatives which I have just presented to you.

At this time, I will turn the microphone over to Mr. Howse.

Senator SCHOEPPEL. Thank you, Mayor.

Mr. EXLINE. Pardon me, Senator, just a correction for the record. The acting mayor of Salina is Mr. Ralph Exline.

Mr. FUGATE. Thank you.

Mr. HOWSE. Senator Schoeppel?

Senator SCHOEPPEL. Mr. Howse.

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Mr. HOWSE. In the interest of conserving the time of the committee, I will summarize the remarks of the municipal conference of mayors and request indulgence of the Chair if I may, that our remarks be filed in full for the record.

Senator SCHOEPPEL. They will be so filed.

(The statement referred to follows:)

STATEMENT CONCURRED IN BY THE MUNICIPAL CONFERENCE OF MAYORS

Mr. Chairman and members of the committee, we wish to express our appreciation for the opportunity to appear before you today to discuss the problems of public water supply in Kansas and to make recommendations for Federal actions.

We wish to express our appreciation of the actions taken by the U.S. Senate in recognizing the serious proportions of the Nation's water problem and in forming the Select Committee on National Water Resources for the purpose of developing a national water resources policy.

We believe the Senate is aware of the fact that no single municipality can solve its water supply problems by itself. The development of a comprehensive long-range national water resources program that can be coordinated with the various States on a river basin basis offers the only possibility of solution for one of the most critical problems facing the country today.

As we understand our basic water situation, we are faced with a substantial increase in population, with a substantial increase in the per capita use of domestic water because of an improved standard of living, with a substantial increase in the agricultural use of water because of the expansion of irrigation and with a substantial increase in the use of water for industrial purposes because of the development of a wide variety of new products and industrial processes. Our present population of 175 million is projected to reach 225 million by 1975 and 245 million by 1980. The estimated withdrawal of water in 1955 was 240 billion gallons per day and the estimated withdrawal in 1975 is 450 billion gallons per day. Presently, some 80 percent of our water is supplied from surface water sources and some 20 percent is supplied from ground water sources. Thus it may be seen that large sections of the country would be in a critical situation today except for the construction of great reservoir projects during the past 30 years.

The present upper limit of our water supply is an average approximately of 12,000 billion gallons per day. At the present time we do not have under construction, or even planned for construction by all the private and public agencies combined, a sufficient number of water projects to provide enough water to meet our 1975 requirements. It is quite clear that the water supply of the country is adequate on the whole but because the supply is variable in time, in place and in quality, the country is facing a water problem of the most serious proportions.

Generally speaking, the water supply problem in Kansas is very similar to the problem at the national level. Statistical information and detailed presentations are scheduled to be given here by various State agencies and in the interest of conserving time such information will not be duplicated in this section on public water supply.

The appointment of a Senate select committee from the membership of the four Senate committees regularly handling various phases of water matters provides a unique opportunity for the coordination of vast knowledge and long experience in the development of a national water resources policy. This prospect will be welcomed by hundreds of municipalities throughout the country who are faced today with the long and tortuous prospect of negotiating water supply projects with some 300 officials in the various State, regional, river basin and Federal agencies concerned after which it will then be necessary to submit each project to the consideration of a variety of congressional committees where it may receive highly qualified professional appraisal and political handling influenced by the various views of Members of Congress and the conflicts between the legislative and executive branches of the Government. The development of joint local-Federal projects is neither quick nor easy in spite of excellent cooperation from the various agencies concerned.

1. We believe that one of the prime prerequisites in the development of a sound national water resources policy is the provision for coordinated planning at the municipal, State, regional, and Federal levels. Accordingly, we recommend the establishment of a directional study and planning program by each of the 50

States, such program to be coordinated by an agency of the Federal Government and supported by Federal grants extended on a cooperative or matching funds basis to each State and such planning operations to include certain minimum standards approved by the Federal Government as acceptable for exchange among the various governmental departments and agencies concerned.

With respect to planning at the national level, Senator Robert S. Kerr (Oklahoma) remarked at hearings held by the Senate Select Committee on National Water Resources in Bismarck, N. Dak., on October 7, 1959, that there had been 20 major reviews of the Nation's water resources in the past 50 years with 7 studies in the past 10 years. While we are not familiar with all of these reports, the 1949 report of the Task Force on National Water Resources of the First Hoover Commission, the monumental 1950 report of the President's Water Resources Policy Commission, the 1955 report of the President's Advisory Committee on Water Resources, and the 1955 report of the Task Force on National Resources and Policy under the Second Hoover Commission are outstanding works characterized by their professional competence and thoroughness. As the result of these studies, two basic factors have been recognized at the national level. First, the river basin or regional approach has been established as the most practical basis for planning water resources development. Second, recognition of the need for coordinated planning at the Federal level has resulted in the establishment of the Federal Interagency Committee for the coordination of water matters in the administrative agencies within the executive branch of the Government. The legislative branch has been somewhat slower in adopting a similar coordinated approach.

With respect to planning at the regional level, some 10 comprehensive surveys have been authorized since 1924 by the Congress for the Arkansas-White-Red River Basins which are now combined as a single unit for water resources planning purposes. These reports include the various 308 reports sent to the Congress in 1935 and the comprehensive and excellent AWRRBIAC report authorized by the Flood Control Act of 1950, directed by the President in 1950, completed in 1955 by the Federal agencies and the eight river basin States concerned and submitted to the Congress by the President in 1957. The Chief of Engineers testified in March 1959 before the Public Works Subcommittee of the House Committee on Appropriations that the AWRRBIAC report had been completed at a cost approximating $10 million and that the total cost of all Arkansas-White-Red River Basin studies approximated some $25 million. The study of the Missouri River Basin and the subsequent adoption of the Pick-Sloan plan and other related plans of water and land resources development provide an excellent basis of planning at the regional level for Kansas water resources.

With respect to planning at the State level, it is a matter of record that Kansas struggled through one water program after another for nearly 75 years until the adoption of the 1945 Water Appropriations Act which established in Kansas the appropriations theory of water rights generally in concert with the basic water laws of most Western States. It may be a matter of interest to the committee to note that this legislation was proposed and approved by the then Governor of Kansas, Andrew F. Schoeppel, now a member of this Senate select committee. Subsequently, developments resulted in the establishment in 1955 of a Kansas Water Resources Board charged with the responsibility of overall planning of water resources in Kansas in coordination with the Kansas Geological Survey, the Water Resources Division of the Kansas Board of Agriculture and the Kansas Board of Health.

Not all States are as fortunate as Kansas in the matter of water resources study and planning. The State geologist of North Dakota testified before the Senate select committee that the first report of the North Dakota Geological Survey was published in 1901 and that the present rate will require until the year 2020 to complete the ground water studies in that State. It is clear to us that all river basin States will be affected adversely unless and until directional planning is coordinated at the Federal level. It is unrealistic to expect that 50 sovereign States and several thousand municipalities can proceed independently of each other to study various aspects of the water resources problem and to accomplish the results required by the severity and magnitude of the present situation.

In our own experience some criteria of study and planning basic data should be adopted by the various municipal, State, and Federal agencies concerned under the direction of the Federal Government. The adoption of a directional study and planning program would permit an orderly and coordinated development of water and land resources programs by river basin States in concert with each other. The adoption of a basic standard of engineering study and

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planning and the approval of such standard by Congress would permit a substantial exchange of basic data and engineering information between the various municipal, State, and Federal agencies concerned and would eliminate the necessity of duplication and reexamination.

In our opinion, directional study and planning will result in an orderly development of public information within each State in a manner consistent with information being developed in other river basin States. An informed public might be more inclined to support a well-rounded program of water resources development and less inclined to commit the errors and indiscretions which may have occurred in the past.

For example, we know the State of Kansas may be divided roughly into three larger areas. Generally speaking, the eastern section has no ground water and surface flow, the central section has ground water and surface flow and the western section has ground water and no surface flow. During the past few years we have learned enough about our own State water problems to recognize that no one single solution is practical for the entire State and that many of the flood control works in eastern Kansas might be constructed on a different basis today.

2. We believe that, as a general principle, all the functions of the Federal departments and agencies concerned with water matters should be coordinated with a clearly defined directive from the Congress. Accordingly, we recommend that Congress reaffirm the policy with respect to the construction of projects for municipal water supply purposes and that this reaffirmation be specific to the extent necessary to provide a frame of reference for the Federal departments and agencies concerned and for the appropriate committees of the Congress.

Historically, the Corps of Engineers has operated in certain areas of the country and principally in matters of flood control, navigation, harbor and channel improvement and municipal water supply. Historically, the Bureau of Reclamation has operated in certain other areas of the country and primarily with irrigation projects although its activities have included an increasing number of other functions such as municipal water supply and hydroelectric power. In our opinion, the recogntion of the principle of maximum use of multiple-purpose projects makes it impossible to distinguish between most of the activities of these two Federal agencies. Enactment of the Water Supply Act of 1958 (Public Law 85–500, 85th Cong.) was an expression of congressional intent to authorize both the Corps of Engineers and the Bureau of Reclamation to construct multiple-purpose projects for municipal water supply among other purposes. Unfortunately, this declaration of congressional policy has not been accepted completely either by the agencies themselves or by the various committees of the Congress.

3. We believe the river basin approach provides the most logical and orderly basis for land and water resources planning. Accordingly, we recommend definitive action by the Congress establishing the river basin as the basic unit for purposes of water resources planning.

Unfortunately, many States and municipalities are not aware of the great advantages of river basin planning. Unfortunately, also, while most administrative departments and agencies at the Federal level have accepted the river basin approach as the logical basis of planning, certain congressional committees and the Congress itself have been slow to recognize the advantages of establishing a common denominator to be used in planning water resources development.

4. We believe that river basins should be administered by the sovereign States concerned through the vehicle of interstate compacts. Accordingly, we recommend definitive action by the Congress approving the principle of multiple State administration of river basins through the device of interstate compacts. It is clear that river basin activities extend beyond the borders of any single State and that administration must be provided either through a coordinated effort of the several States involved or by the Federal Government. Without getting into a discussion of the merits it may be stated that we are not recommending the establishment of river valley authorities at this time.

5. We believe that the long-range water supply requirements of this country ultimately will require the maximum development of each reservoir site. Accordingly, we recommend that Congress adopt such legislation as may be necessary to establish the principle of maximum site development.

Reservoir sites are few and far between and, once developed for single purposes, are lost for other use in most instances. It is clear that maximum site development contemplates both present and future use. Therefore, considera-

tion must be given to long-term financing of reserve capacity in a manner consistent with projected increases in water use. In this respect, enactment of the Water Supply Act of 1958 (Public Law 85–500, 85th Cong.) tends to establish congressional intent with respect to present and future water supply capacity. Unfortunately, this policy enacted by the Water Supply Act of 1958 has not been accepted completely by the Federal departments and agencies concerned with the administration of water legislation nor by the respective congressional committees. In our opinion, the intent of Congress with respect to present and reserve water supply capacity should be reaffirmed.

6. We believe that if Congress adopts the principle of maximum use of each reservoir site, it must follow as night follows day that Congress must recognize also the multiple-purpose uses involved in maximum site development. Accordingly, we recommend definitive congressional action adopting the principle of multiple use.

It is evident that Congress should recognize the benefits, both primary and secondary and tangible or intangible, accruing to the purposes of flood control, irrigation, water supply, pollution abatement, conservation of fish and wildlife, navigation, hydroelectric power, salinity control, and watershed management and thereafter should establish a standard of evaluation of benefits in such manner as to be applicable alike to all projects in similar circumstances. In this respect, certain bills introduced in the first session of the 86th Congress, specifically the proposed Water Conservation Act of 1959 (H.R. 8) introduced in the House of Representatives by Congressman James W. Trimble (Arkansas) and introduced in the Senate by Senator Robert S. Kerr (Oklahoma), indicate the trend of congressional consideration of this general principle. It is axiomatic that under present Federal procedures the development of maximum-use, multiple-purpose reservoirs results in economic benefits accruing to the Federal Government in an amount approximating $2 for each $1 of Federal cost.

7. We believe there is a marked difference in benefits in and costs of single-purpose projects as against multiple-purpose projects. Accordingly, we recommend congressional recognition of such benefits and cost distinction.

For example, it is obvious that single-purpose flood-control ditches draining water through a specific area are in one category and that flood-control reservoir works providing protection downstream to an entire river basin are in another category. The principle of assessing benefits and costs against identifiable local interests is sound. On the other hand, such legislative policy as proposed by the Bush bill (S. 2060 as introduced in the first session of the 86th Congress appears to us to ignore entirely the basic distinction of costs and benefits in single-purpose versus multiple-purpose projects.

8. We believe that cost allocations in multiple-purpose projects should be established objectively by the administrative departments and agencies charged with the responsibility of administering Federal water legislation. Accordingly, we recommend that cost allocations be calculated in accordance with administrative procedures approved by the Congress and that such cost allocations in turn be considered by the Congress as reimbursable or nonreimbursable in accordance with standards applicable alike to all projects under similar circumstances.

We are aware of the complexity and the difficulty in calculating respective cost allocations in multiple-purpose projects. The separable costs remaining benefits method established by the Bureau of the Budget in Circular A–47 issued December 31, 1952, represents the combined best thinking of all the Federal departments and agencies concerned with water matters. Insofar as we are aware, it probably is a fair and reasonable approach to the complex problem of cost allocations. Our position is not to approve or to disapprove the administrative procedures outlined in Budget Circular A–47 but to recommend the adoption of administrative procedures applicable alike to all projects under similar circumstances.

9. We believe that congressional intent with respect to the nonreimbursability of project costs allocated to the conservation of fish and wildlife should be clarified. Accordingly, we recommend that such cost allocations be computed as outlined above in accordance with administrative procedures approved by the Congress and Federal policy reaffirmed by the Congress and applicable alike to all projects in similar circumstances.

With respect to the conservation of fish and wildlife, we recognize that Federal policy in this matter has been established by the Fish and Wildlife Conservation Act of March 10, 1934 (Public Law 121, 73d Cong.), by the Fish and Wildlife Conservation Act of August 14, 1946 (Public Law 732, 79th Cong.) and by the

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Fish and Wildlife Coordination Act of August 12, 1958 (Public Law 624, 85th Cong.). Unfortunately, some confusion exists among the administrative agencies and congressional committees with respect to procedures and policy involving Federal participation in project costs allocated to conservation of fish and wildlife purposes. In the water-starved plains country these purposes may have special significance and certainly the construction of reservoir projects in Kansas tends to provide fish and wildlife conservation opportunities that supplement the functions of a great chain of reservoirs in Texas, Oklahoma, New Mexico, Colorado, Nebraska, North and South Dakota, and Montana. Conservation of fish and wildlife serves an important purpose to the people of Kansas and we urge that every attempt be made to clarify Federal policy applicable to this purpose.

10. We believe that the use of water reservoir projects provides an unusual opportunity for recreation purposes. Accordingly, we recommend establishment of a congressional policy authorizing Federal participation in project costs attributable to recreation purposes.

It has long been recognized that public facilities must be made available to our people for recreation purposes. The great public park areas have been administered by the Federal Government in accordance with this principle. Similarly municipalities have provided parks, playgrounds, community centers, and similar recreation facilities. It has been calculated that the per capita cost of providing recreation facilities on multiple-purpose reservoirs is less than similar cost on most other type projects. In connection with present multiple-purpose reservoirs, it has been established that recreation facilities are used extensively on an interstate, regional, and national basis. It would be inappropriate to restrict for local use only those multiple-purpose reservoir projects constructed partially with Federal funds. As a corollary of that position it seems to us that Federal participation in recreation costs would be appropriate. In this respect we believe the policies of S. 159 introduced in the Senate of the United States during the 1st session of the 86th Congress by Senator Robert S. Kerr (Oklahoma) appropriately reflect the suggestions outlined herein.

11. We believe that water resources projects should be constructed in accordance with an overall river basin plan and subject to the principle of maximum-use multiple-purpose development. Accordingly, we recommend congressional recognition of the financial and legal limits at the local level which make it impractical for municipalities to develop such river basin improvements by themselves.

We have been advised by counsel that there may be some legal restrictions as to: (1) the municipal construction of water reservoir works on interstate navigable rivers and their tributaries, and (2) the municipal right of condemnation of Federal-aid highways involved in reservoir sites. If the principle of maximum-use, multiple-purpose development is sound, it then follows that the public interest is not served by permitting any municipality to underdevelop reservoir sites with improvements that will prevent maximum use at a later date. It is impossible for any municipality to develop an entire river basin by itself and it is not in the public interest to permit municipalities to develop reservoir works except as they may be an integral part of an overall river basin plan.

If we accept the thesis that water reservoir projects must be developed to their maximum use in accordance with river basin planning, it becomes clear that benefits of irrigation, flood control, recreation, conservation, navigation, hydroelectric power, pollution abatement, and even water supply itself will accrue to a regional or interstate area and not alone to a single municipality. In the case of the Cheney division, Wichita reclamation project, now before the Irrigation and Reclamation Subcommittee of the Senate Committee on Interior and Insular Affairs, and in the matter of municipal water supply purposes only, the city of Wichita will be discharging for the benefit of downstream users some 60 million gallons of water per day for which volume the city of Wichita proposes to reimburse the Federal Government.

Most municipalities in Kansas are restiricted to a 10- or 20-year term in the issuance of improvement bonds. Since water reservoir works have an economic life varying from 50 to 100 years it is apparent that the usual methods of municipal financing are inadequate for water supply purposes.

12. We believe that no one should enjoy the unrestricted right to pollute water supply sources. Accordingly, we recommend congressional approval of a policy requiring the establishment of an adequate pollution abatement program by each State board of health in conjunction with the U.S. Public Health Service

and compliance therewith as a condition precedent to Federal aid for water resources development purposes.

Because of the scarcity of our water supply, it must be recognized that we cannot permit uncontrolled and indiscriminate use of our water resources by any one individual, any one municipality, or any one State. It is recognized that the quickest way to alleviate our immediate water shortage is to clean up the water which is already available. It is unrealistic to expect individual municipalities or even single States to adopt pollution control measures unless and until comparable practices are adopted by all municipalities and States in a given river basin area. In this connection, the Public Health Service Act of July 1, 1944 (Public Law 410, 78th Cong.), the Water Pollution Control Act of June 30, 1948 (Public Law 845, 80th Cong.), the Water Pollution Control Act of July 17, 1952 (Public Law 579, 82d Cong.), the Water Pollution Control Act of 1954 (Public Law 472, 83d Cong.), and the Water Pollution Control Act of July 9, 1956 (Public Law 60, 84th Cong.) have established a trend in the right direction at the State and municipal levels. We are proud of the pollution abatement program developed by the Kansas Board of Health in conjunction with the U.S. Public Health Service and the splendid results which have followed a vigorous educational and enforcement program.

With the rapid increase in population and industrial production and a consequent increase in the volume of domestic and industrial waste, we recognize the need for primary sewage treatment, secondary sewage treatment, and low-flow augmentation for dilution purposes. However, the use of large volumes of scarce water as a substitute for adequate sewage treatment operations cannot be countenanced. Similarly, the inclusion of water storage capacity in reservoir works as a substitute for proper sewage treatment processes is not in the public interest.

13. We believe that no one should be permitted to waste water, particularly during periods of severe water shortage. Accordingly, we recommend Congress approve the adoption of a minimum standard of water conservation ordinances or statutes as a condition precedent to Federal aid in the development of water resources projects.

It its recognized that some 95 percent of industrial water and some 70 percent of municipal water is returnable for reuse with a minimum-type treatment. Municipal investment in waterworks facilities has quadrupled in the past decade and may be expected to increase even more rapidly during the next decade. The enormous capital investment required to maintain municipal water supply operations makes it imperative that cities establish realistic rate structures without hidden subsidies to any segment of their economies. If large volume users of water are not permitted to buy water below cost, they will tend to recognize the tremendous savings which can be accomplished through the adoption of water conservation practices. Federal assistance should not be used to permit a continuation of water waste practices or of water rate subsidy to any municipality or water user.

14. We believe that no one should be permitted to mine ground water resources indiscriminately and without adopting every possible conservation and recharge practice. Accordingly, we recommend that the Congress establish a policy requiring the adoption of a minimum standard of conservation and recharge operations as a condition precedent to Federal aid where ground water sources are involved.

It is recognized that unusual advantages accrue in the joint operation of ground water reservoirs and surface water works. The questions of seasonal supply and demand, temperature, quality, taste, and many other factors combine to recommend such joint operation. In many sections of the country and under certain climatic and soil conditions recharge operations may be impractical. On the other hand, ground water reservoirs are of such value as to make it desirable that all appropriate conservation and recharge measures be adopted under the supervision of the State geologist wherever appropriate in connection with ground water withdrawals.

15. We believe that a uniform interest rate should apply alike to all joint local-Federal water projects in similar categories. Accordingly, we recommend that Congress adopt policy with respect to uniform interest rates applicable to water project financing.

A tight money market, a hard money policy, and a wide fluctuation of interest rates on Federal long-term securities have combined to produce some pressures within the Congress to assess the current rate of interest against water

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supply projects as they are approved. This practice has resulted in the imposition of a variety of interest rates against many projects now authorized. During the present period of inflation and manipulation of the money supply, the prevailing interest rate may or may not reflect a reasonable price for long-term money. The serious proportions of this matter are evident in considering the effect of as small an amount as one-fourth of 1-percent increase in the interest rate of a 50-year multimillion-dollar project. In this respect the interest provisions specified in the Water Supply Act of 1958 (Public Law 85–500, 85th Cong.) and in S. 1591 introduced in the Senate during the 1st session of the 86th Congress by Senator Robert S. Kerr (Oklahoma), chairman of the Senate select committee, reflect an approach which may be considered sensible and reasonable under all the circumstances.

16. We believe the respective Federal-State relations in the field of water rights should be clearly established. Accordingly, we recommend that the Congress adopt definitive legislation to establish the respective rights of the various States and the Federal Government in the field of water rights.

The recent Supreme Court decision in the so-called *Pelton Dam* case has resulted in much uncertainty which must be removed if States and private interests are to be expected to continue to make substantial investments in waterworks projects. The volume and variety of legislation in this respect now being considered by the House Committee on Interior and Insular Affairs is indicative of the widespread concern in this matter and needs no further comments here.

17. We believe that joint local-Federal water supply projects should be considered by Congress only after all appropriate actions have been completed at the local level. Accordingly, we recommend that the Congress adopt the policy of establishing a minimum standard of actions as a condition precedent to congressional consideration of joint municipal-Federal projects.

In the development of any joint local-Federal project, a lengthy procedure is involved both at the municipal and Federal levels. Because of the large number of projects and the amounts of money that may be involved, it would appear desirable that all local requirements be accomplished in connection with the negotiations between the municipality and the Federal administrative agency concerned prior to project consideration by the Congress. For example, in the case of the Cheney division, Wichita reclamation project, now before the Irrigation and Reclamation Subcommittee of the Senate Committee on Interior and Insular Affairs, the city of Wichita has expended certain funds for engineering purposes on a contributing funds basis, has obtained the necessary enabling legislation, has complied with the pollution abatement policy developed by the Kansas Board of Health in conjunction with the U.S. Public Health Service, has purchased the distribution facilities of the privately owned utility, has integrated a completely owned municipal water system, has obtained the necessary water permits from the appropriate agency of the State of Kansas, has adopted a long-range program of financing for its water projects through the use of water revenue bonds, has obtained the approval of the electorate of the various segments of the water development programs requiring public elections under Kansas statutes, has negotiated the standard form repayment contract with an agency of the Federal Government on terms and conditions well within present policies as established by legislation, and has taken formal action to obligate itself to execute the repayment contract when the project is approved by Congress and the final reimbursable amounts have been determined by the Secretary of the Interior. It appears desirable that all joint local-Federal projects should be forwarded to the Congress only after all appropriate actions have been taken at the local level.

18. We believe that municipalities are entitled to receive prompt action by the Federal Government after the municipality is in compliance with all Federal requirements under applicable policy established by the Congress and after the municipality has completed all necessary action at the local level. Accordingly, we recommend the Congress establish an administrative agency for the purpose of financing reimbursable project costs in accordance with such policies as may be established from time to time by legislation.

Municipal participation in joint local-Federal projects requires a great deal of time, effort, and preparation in effecting compliance with State and Federal legislation. After a project has been negotiated through the Federal agencies concerned, and after it has been submitted to the electorate for local approval, municipalities are entitled to receive and obligated to press for immediate consideration by the Congress. The inflationary factor and other related cost problems may alter radically the various project costs with each year of

delay. Times change, conditions change, money rates change, and all these factors are adversely affected by delay. In addition, and unless a municipality has been prudent in anticipating its water supply needs by at least 10 years, it may find itself running out of water during the period of protracted project consideration.

It appears that the volume and variety of water projects forthcoming in the future will impose a burden on the Congress that cannot be resolved by the use of the legislative process in each individual case. It would seem that the establishment of an administrative agency such as a Water Finance Corporation, similar in character to the Reconstruction Finance Corporation, the Federal Housing Administration, or the Defense Production Administration, with authority to make or to guarantee loans might serve a useful purpose in the administration and development of water resources projects within the policies and limits approved by the Congress. In one sense of the word, the Small Reclamation Projects Act of August 6, 1956 (Public Law 984, 84th Cong.) recognizes these administrative difficulties, particularly in small projects involving Federal financing of not more than $5 million where authorizations are approved by the Federal agency concerned unless Congress objects in each case within a 60-day period of time after appropriate notification.

In conclusion, may we thank the chairman and members of the Senate Select Committee on National Water Resources for this opportunity to express the views of the many municipalities comprising the conference of mayors under whose authorization we have appeared here today in connection with the public water supply problems in the State of Kansas.

Respectfully submitted.

JUSTUS H. FUGATE, *Mayor of Wichita.*
A. E. HOWSE, *Former Mayor of Wichita.*

Mr. HOWSE. Mr. Chairman and members of the committee, we wish to express our appreciation for the opportunity to appear before you today to discuss the problems of public water supply in Kansas, and to make recommendations for Federal action, as to public water supply in Kansas.

We believe the Senate is aware of the fact that no single municipality can solve its water supply problems by itself. The development of a comprehensive long-range national water resource program that can be coordinated with the various States on a river basin basis offers the only possibility of solution for one of the most critical problems facing the country today.

The appointment of a Senate select committee from the membership of the four committees regularly handling various phases of water matters provides a unique opportunity for the coordination of a vast knowledge and long experience in the development of the national water resources policy.

This prospect will be welcomed by hundreds of municipalities throughout the country who are faced today with the long and tortuous prospect of negotiating water supply projects to some of 300 officials in the various State, regional, river basin, and Federal agencies concerned, after which it will then be necessary to submit each project to the consideration of a variety of congressional committees where it may receive qualified professional appraisal and/or political handling influenced by the various views of the members and the confliction between the legislative and executive branches of the Government.

The development of joint local-Federal projects is neither quick nor easy in spite of excellent cooperation from the various agencies concerned.

I may say in our own case, if I can dwell on a personal matter for a moment—in spite of the excellent cooperation which we have experienced, Senator Schoeppel, in the city of Wichita, from yourself and

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our good Congressman Ed Rees, who is present, we have a number of specific suggestions to make to the committee.

1. We believe that one of the prime prerequisites in the development of a sound national water resources policy is the provision for coordinated planning at the municipal, State, regional, and Federal levels.

Accordingly, we recommend the establishment of a directional study and planning program by each of the 50 States, such program to be coordinated by an agency of the Federal Government and supported by Federal grants extended on a cooperative or matching fund basis to each State and such planning operations to include certain minimum standards approved by the Federal Government as acceptable for exchange among the various governmental departments and agencies concerned.

With respect to planning on the national level, Senator Robert S. Kerr, Oklahoma, remarked at hearings held by the Senate Select Committee on National Water Resources at Bismarck, N. Dak., on October 7, 1959, that there had been 20 major reviews of the Nation's water resources in the past 50 years with 7 studies in the past 10 years.

As the result of these studies, two basic factors have been recognized at the national level.

First, the river basin or regional approach has been established as the most practical basis for planning water resources development.

Second, recognition of the need for coordinated planning at the Federal level has resulted in the establishment of the Federal interagency committee for the coordination of water matters in the administrative agencies within the executive branch of the Government.

The legislative branch has been somewhat slower in adopting a similar coordinated approach.

The State geologist of North Dakota testified before the Senate select committee that the first report of the North Dakota Geological Survey was published in 1901 and that the present rate will require until the year 2020 to complete the ground water studies in that State.

It is clear to us that all river basin States will be affected adversely unless and until directional planning is coordinated at the Federal level.

It is unrealistic to expect that 50 sovereign States and several thousand municipalities can proceed independently of each other to study various aspects of the water resources problem and to accomplish the results required by the severity and magnitude of the present situation.

In our own experience some criteria of study and planning basic data should be adopted by the various municipal, State, and Federal agencies concerned under the direction of the Federal Government.

The adoption of a directional study and planning program would permit an orderly and coordinated development of water and land resources programs by river basin States in concert with each other.

The adoption of a basic standard of engineering study and planning with the approval of such standard by Congress, would permit a substantial exchange of basic data and engineering information between the various municipal, State, and Federal agencies concerned and would eliminate the necessity of duplication and reexamination.

2. We believe that, as a general principle, all the functions of the Federal departments and agencies concerned with water matters

should be coordinated with a clearly defined directive from the Congress.

Enactment of the water supplies of 1958 which we heard described this morning as the Kerr-Case amendment, was an expression of congressional intent to authorize both the Corps of Engineers and the Bureau of Reclamation to construct multiple purpose projects for municipal water supply, among other purposes.

Unfortunately, this recommendation of congressional policy has not been accepted completely either by the agencies themselves, or by the various committees of the Congress.

3. We believe the river basin approach provides the most logical and orderly basis for land and water resources planning. Accordingly, we recommend definitive action by the Congress establishing the river basin as the basic unit for purposes of water resources planning.

Unfortunately, many States and municipalities are not aware of the great advantages of river basin planning.

Unfortunately also while most administrative departments and agencies at the Federal level have accepted the river basin approach as the logical basis of planning, certain congressional committees, and the Congress itself, have been slow to recognize the advantages of establishing a common denominator to be used in planning water resources development.

4. We believe that river basins should be administered by the sovereign States concerned through the vehicle of interstate compacts.

Accordingly, we recommend definitive action by the Congress approving the principle of multiple State administration of river basins through the device of interstate compacts.

It is clear that river basin activities extend beyond the borders of any single State and that administration must be provided either through a coordinated effort of the several States involved or by the Federal Government.

Without getting into a discussion of the merits it may be stated that we are not recommending the establishment of river valley authorities at this time.

5. We believe that the long range water supply requirements of this country ultimately will require the maximum development of each reservoir site.

Accordingly we recommend that Congress adopt such legislation as may be necessary to establish the principle of maximum site development.

Reservoir sites are few and far between and, once developed for single purposes, are lost for other use in most instances.

It is clear that maximum site development contemplates both present and future use. Therefore, consideration must be given to long-term financing of reserve capacity in a manner consistent with projected increases in water use.

In this respect, enactment of the Water Supply Act of 1958—Public Law 85-500—tends to establish congressional intent with respect to present and future water supply capacity.

In our opinion, the intent of Congress with respect to present and reserve water supply capacity should be reaffirmed.

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6. We believe that if Congress adopts the principle of maximum use of each reservoir site, it must follow as night follows day that Congress must recognize also the multiple purpose uses involved in maximum site development.

Accordingly, we recommend definite congressional action adopting the principle of multiple use.

It is evident that Congress should recognize the benefits, both primary and secondary, and tangible or intangible, accruing to the purposes of flood control, irrigation, water supply, pollution abatement, conservation of fish and wildlife, navigation, hydroelectric power, salinity control, and watershed management and thereafter should establish a standard of evaluation of benefits in such manner as to be applicable alike to all projects in similar circumstances.

In this respect——

The CHAIRMAN. May I interrupt you there for just a moment?

Mr. HOWSE. Yes, sir.

The CHAIRMAN. Did you consider recreational or did you include that in fish and wildlife?

Mr. HOWSE. Senator, I include that in fish and wildlife. We were proposing full consideration of the recreational benefits and we treated that seperately in the statement.

The CHAIRMAN. Fine.

Mr. HOWSE. In this respect, certain bills introduced in the first session of the 86th Congress, specifically the proposed Water Conservation Act of 1959, H.R. 8, introduced in the House of Representatives by Congressman James W. Trimble, Arkansas, and introduced in the Senate by Senator Robert S. Kerr, Oklahoma, indicate the trend of congressional consideration of this general principle.

It is axiomatic that under present Federal procedures the development of maximum use, multiple purpose reservoirs results in economic benefits accruing to the Federal Government in an amount approximating $2 for each $1 of Federal cost.

7. We believe there is a marked difference in benefits in costs of single purpose project as against multiple-purpose projects.

Accordingly, we recommend congressional recognition of such benefits and cost distinction.

For example, it is obvious that single purpose flood control ditches draining water through a specific area are in one category, and that flood control reservoir works providing protection downstream to an entire river basin are in another category.

The principle of assessing benefits and costs against identifiable local interests is sound.

On the other hand, such legislative policy as proposed by the Bush bill, S. 2060, as introduced in the first session of the 86th Congress, appears to us to ignore entirely the basic distinction of costs and benefits in single purpose versus multiple purpose projects.

8. We believe that cost allocations in multiple purpose projects should be established objectively by the administrative departments and agencies charged with the responsibility of administering Federal water legislation.

Accordingly, we recommend that cost allocations be calculated in accordance with administrative procedures approved by the Congress and that such cost allocations in turn be considered by the Congress

as reimbursable or nonreimbursable in accordance with standards applicable alike to all projects under similar circumstances.

We are aware of the complexity and the difficulty in calculating respective cost allocations in multiple-purpose projects.

The separable costs remaining benefits method established by the Bureau of the Budget in Circular A47, issued December 31, 1952, represents the combined best thinking of all the Federal departments and agencies concerned with water matters.

You heard, of course, this morning, the Soil Conservation people object to the use of Circular A47 as it applies to soil conservation practices.

Our position is not to approve or disapprove the administrative procedures outlined in Budget Circular A47, but to recommend the adoption of administrative procedures applicable alike to all projects under similar circumstances.

In the water starved plains country these purposes may have special significance and certainly the construction of reservoir projects in Kansas tends to provide fish and wildlife conservation opportunities that supplement the functions of a great chain of reservoirs in Texas, Oklahoma, New Mexico, Colorado, Nebraska, North and South Dakota, and Montana.

10. We believe that the use of water reservoir projects provides an unusual opportunity for recreation purposes. Accordingly, we recommend establishment of a congressional policy authorizing Federal participation in project costs attributable to recreation purposes.

It has long been recognized that public facilities must be made available to our people for recreation purposes. The great public park areas have been administered by the Federal Government in accordance with this principle.

Similarly, municipalities have provided parks, playgrounds, community centers and similar recreation facilities.

It has been calculated that the per capita cost of providing recreation facilities on multiple purpose reservoirs is less than similar cost on most other type projects.

In connection with present multiple-purpose reservoirs, it has been established that recreation facilities are used extensively on an interstate, regional, and national basis.

It would be inappropriate to restrict for local use only those multiple-purpose reservoir projects constructed partially with Federal funds.

As a corollary of that position, it seems to us that Federal participation in recreation costs would be inappropriate.

In this respect we believe the policies of S. 159, introduced in the Senate of the United States during the 1st session of the 86th Congress by Senator Robert S. Kerr, Oklahoma, appropriately reflect the suggestions outlined herein.

The CHAIRMAN. Colonel, we are going to hold hearings on that bill shortly after the turn of the year. We will be honored and delighted to have you appear before us and testify on it.

Mr. HOWSE. Senator, we will be there. Thank you.

11. We believe that water resources projects should be constructed in accordance with an overall river basin plan and subject to the principle of maximum use multiple-purpose development.

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Accordingly, we recommend congressional recognition of the financial and legal limits at the local level which make it impractical for municipalities to develop such river basin improvements by themselves.

If the principle of maximum use, multiple-purpose development is sound, it then follows that the public interest is not served by permitting any municipality to underdevelop reservoir sites with improvements that will prevent maximum use at a later date.

It is impossible for any municipality to develop an entire river basin by itself and it is not in the public interest to permit municipalities to develop reservoir work except as they may be an integral part of an overall river basin plan.

If we accept the thesis that water reservoir projects must be developed to their maximum use in accordance with river basin planning, it becomes clear that benefits of irrigation, flood control, recreation, conservation, navigation, hydroelectric power, pollution abatement, and even water supply itself will accrue to a regional or interstate area and not alone to a single municipality.

Senator SCHOEPPEL. Colonel Howse, I would like to ask you there with reference to your basin development and interstate approach. Would you recommend the establishment of, let's say, a river basin commission through the medium of interstate compact in addition to Federal representatives?

Mr. HOWSE. Senator, I would like to answer you this way:

We submitted to the cities in this municipal congress the suggestion that river basin development should be governed or directed by the States through the medium of interstate compact. That was approved.

I do not feel that I can digress from that position today, but I would say personally that the addition of a Federal or appropriate Federal representation in my view, would be quite proper.

Senator SCHOEPPEL. Thank you.

The CHAIRMAN. Colonel, actually the function of the interstate compact is to determine the rights of the compacting States with reference to use of the water and the return of it to the normal flowage of the watershed.

I wonder if you would think that a compact should go beyond that.

Mr. HOWSE. Senator Kerr, and answering you just off the cuff now, I would say no. We are not in any sense of the word prepared to recommend today valley authorities or anything of that sort.

The CHAIRMAN. Anything that you create in the way of an instrumentality with power beyond that of determining the ownership of the States or the right of the States in the beneficial use of the water would be moving in that direction, would it not?

Mr. HOWSE. I would think it would; yes, sir.

No. 12: We believe that no one should——

The CHAIRMAN. You make a point in the next part of that last paragraph that I think is very important, Colonel.

Mr. HOWSE. Are you speaking now, Senator, of the economic life?

The CHAIRMAN. In the case of the Cheney division, Wichita reclamation project, you talk about buying water, using it, and then returning it to the stream.

Mr. HOWSE. I am glad you brought that up because I was not permitting myself to indulge in discussing any local projects in this presentation.

The CHAIRMAN. I understand, but I think it is a situation that has broad and widespread application.

Mr. HOWSE. It is a typical example of what happens.

In our case we will be discharging 60 million gallons of water a day downstream to the people of Oklahoma in the Arkansas River, good, usable water originated at our own expense as far as water supply is concerned.

The CHAIRMAN. In other words, you use the water. You probably reduce the volume less than 3 percent.

Mr. HOWSE. Not more than five, at any rate.

The CHAIRMAN. And then return it to the stream for the use of those on downstream, although you have actually bought it and paid for it and reused it.

Mr. HOWSE. That is correct.

12. We believe that no one should enjoy the unrestricted right to pollute water supply sources.

Accordingly, we recommend congressional approval of a policy requiring the establishment of an adequate pollution abatement program by each State board of health in conjunction with the U.S. Public Health Service, and compliance therewith as a condition precedent to Federal aid for water resources development purposes.

Because of the scarcity of our water supply, it must be recognized that we cannot permit uncontrolled and indiscriminate use of our water resources by any one individual, any one municipality, or any one State.

It is recognized that the quickest way to alleviate our immediate water shortage is to clean up the water which is already available.

It is unrealistic to expect individual municipalities or even single States to adopt pollution control measures unless and until comparable practices are adopted by all municipalities and States in a given river basin area.

We are proud of the pollution abatement program developed by the Kansas Board of Health in conjunction with the U.S. Public Health Service, and the splendid results which have followed a vigorous educational and enforcement program.

With the rapid increase in population and industrial production and a consequent increase in the volume of domestic and industrial waste, we recognize the need for primary sewage treatment, secondary sewage treatment, and low flow augmentation for dilution purposes.

However, the use of large volumes of scarce water as a substitute for adequate sewage treatment operations cannot be countenanced.

Similarly, the inclusion of water storage capacity in reservoir works as a substitute for proper sewage treatment processes is not in the public interest.

13. We believe that no one should be permitted to waste water, particularly during periods of severe water shortage.

Accordingly, we recommend Congress approve the adoption of a minimum standard of water conservation ordinances or statutes as a condition precedent to Federal aid in the development of water resources projects.

It is recognized that some 95 percent industrial water and some 70 percent of municipal water is returnable for reuse with a minimum type treatment. Municipal investment in waterworks facilities has

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qaudrupled in the past decade and may be expected to increase even more rapidly during the next decade.

The enormous capital investment required to maintain municipal water supply operations makes it imperative that cities establish realistic rate structures without hidden subsidies to any segment of their economies.

If large volume users of water are not permitted to buy water below cost they will tend to recognize the tremendous savings which can be accomplished through the adoption of water conservation practices.

Federal assistance should not be used to permit a continuation of water waste practices or of water rate subsidy to any municipality or water user.

14. We believe that no one should be permitted to mine ground water resources indiscriminately and without adopting every possible conservation and recharge practice.

Accordingly, we recommend that the Congress establish a policy requiring the adoption of a minimum standard of conservation and recharge operations as a condition precedent to Federal aid where gorund water sources are involved.

It is recognized that unusual advantages accrue in the joint operation of ground water reservoirs and surface waterworks.

The question on seasonal supply and demand, temperature, quality, taste and many other factors combine to recommend such joint operation.

In many sections of the country and under certain climatic and soil conditions recharge operations may be impractical.

On the other hand, ground water reservoirs are of such value as to make it desirable that all appropriate conservation and recharge measures be adopted under the supervision of the State geologist wherever appropriate in connection with ground water withdrawals.

15. We believe that a uniform interest rate should apply alike to all joint local Federal water projects in similar categories.

Accordingly, we recommend that Congress adopt a policy with respect to uniform interest rates applicable to water project financing.

A tight money market, a hard money policy and a wide fluctuation of interest rates on Federal long-term securities have combined to produce some pressures within the Congress to assess the current rate of interest against water supply projects as they are approved.

This practice has resulted in the imposition of a variety of interest rates against many projects now authorized.

During the present period of inflation and manipulation of the money supply, the prevailing interest rate may or may not reflect a reasonable price for long-term money.

In this respect the interest provisions specified in the Water Supply Act of 1958, Public Law 85–500, 85th Congress, and in S. 1591 introduced in the Senate during the first session of the 86th Congress, by Senator Robert S. Kerr, Oklahoma, chairman of the Senate select committee, reflect an approach which may be considered sensible and reasonable under all the circumstances.

16. We believe the respective Federal-State relations in the field of water rights should be clearly established.

Accordingly, we recommend that the Congress adopt definitive legislation to establish the respective rights of the various States and the Federal Government in the field of water rights.

You have heard every witness today comment on that same subject. It needs no further elaboration here.

17. We believe that joint local Federal water supply projects should be considered by Congress, only after all appropriate actions have been completed at the local level.

Accordingly, we recommend that the Congress adopt the policy of establishing a minimum standard of action as a condition precedent to congressional consideration of joint municipal Federal projects.

In the development of any joint local Federal project, a lengthy procedure is involved both at the municipal and Federal levels.

Because of the large number of projects and the amounts of money that may be involved, it would appear desirable that all local requirements be accomplished in connection with the negotiations between the municipality and the Federal administrative agency concerned prior to project consideration by the Congress.

That, Senator Kerr, if I might without touching on it in my testimony, we pointed out in the case of the project we have done just that. We have completed all of the requirements including obligating the city to execute the repayment contract.

18. We believe that municipalities are entitled to receive prompt action by the Federal Government after the municipality is in compliance with all Federal requirements under applicable policy established by the Congress and after the municipality has completed all necessary action at the local level.

Accordingly, we recommend that the Congress establish an administrative agency for the purpose of financing reimbursable project costs in accordance with such policies as may be established from time to time by legislation.

Municipal participation in joint local Federal projects requires a great deal of time, effort, and preparation in effecting compliance with State and Federal legislation.

After a project has been negotiated through the Federal agencies concerned, and after it has been submitted to the electorate for local approval, municipalities are entitled to receive, and obligated to press for, immediate consideration by the Congress.

The inflationary factor and other related cost problems may alter radically the various project costs with each year of delay. Times change, conditions change, money rates change, and all these factors are adversely affected by delay.

What may be more important, unless the municipality has been prudent in anticipating its water supply needs by at least 10 years, it may find itself running out of water during the period of protracted project consideration.

It appears that the volume and variety of water projects forthcoming in the future will impose a burden on the Congress that cannot be resolved by the use of the legislative process in each individual case.

It would seem that the establishment of an administrative agency such as a water finance corporation, similar in character to the Reconstruction Finance Corporation, the Federal Housing Administration, or the Defense Production Administration, with authority to make or to guarantee loans, might serve a useful purpose in the administration and development of water resources projects within the policies and limits approved by the Congress.

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In conclusion, may we thank the chairman and members of the Senate Select Committee on National Water Resources for this opportunity to express the views of the many municipalities comprising the conference of mayors under whose authorization we have appeared here today in connection with the public water supply problems in the State of Kansas.

Thank you.

The CHAIRMAN. I am impressed with the rare judgment and broad knowledge you used with reference to pending and passed legislation. It is one of the best statements I have heard in any hearing.

Mr. HOWSE. Senator, thank you, very much. I had a lot of help in getting it together.

The CHAIRMAN. It is worth it all to this committee.

Mr. HOWSE. Thank you very much.

The CHAIRMAN. Who is the next witness.

Mr. HOWSE. Further, Senator, I should like to say for the record that other mayors and I are accompanied today by Mr. O. K. Brandon, the president of the Kansas section of the American Water Works Association, and by his associate, Mr. Russell L. Culp, who is the chairman of the Water Resources Committee of the Kansas section of the AWWA who have filed with the clerk of the committee 25 copies of their statement in general support of the position just given.

The CHAIRMAN. Fine.

Mr. HOWSE. Further, we have present with us today Mr. Rollind H. Olson, who is president of the Kansas Association of Municipal Utilities and similarly he filed with the committee a statement, a general statement of that association supporting the general position just given.

We have also present today, Mr. Murray Wilson, consulting engineer, representing the city of Salina, who in like manner has filed a statement with the clerk of the committe supporting this position, and finally, Mr. J. E. Hargett, representing the mayor of the city of Marion, who has also filed a statement with the clerk of the committee.

Thank you very much, Senator.

The CHAIRMAN. Thank you, Colonel.

(The statements referred to follow:)

STATEMENT OF KANSAS ASSOCIATION OF MUNICIPAL UTILITIES PRESENTED BY ROLLIND H. OLSON, PRESIDENT

PUBLIC WATER SUPPLY PROBLEMS AND RECOMMENDATIONS

The Kansas Association of Municipal Utilities wishes to express its appreciation for the opportunity to appear before you concerning Public Water Supply Problems and Recommendations.

This association represents 78 municipal water utilities in the State of Kansas.

The Kansas Association of Municipal Utilities endorses the complete 20-page statement of the municipal conference of mayors concerning Public Water Supply Problems and Recommendations, as presented to your committee by Justus H. Fugate, mayor of Wichita, and A. W. Howse, former mayor of Wichita.

We wish to thank the chairman and members of the Senate Select Committee on National Water Resources for this opportunity to express our views in connection with public water supply problems.

STATEMENT FOR THE CITY OF SALINA, KANS., BY MURRAY A. WILSON

The cities of Kansas are definitely interested in the problem of water supplies in the future. They have seen the per capita use of water mount steadily for the past 20 years, and during the past 10 years they have seen their populations

grow at varying and unpredictable rates. Most members of the governing bodies of the cities of Kansas realize that Kansas belongs in the group of States whose ability to support population and manufacturing activities is measured by the amount of water available. The man on the street doesn't realize this, and many will never believe it until their hometown is faced with a water shortage.

Industry is inseparably attached to cities, and the problem of water supply in the future concerns industry in the abstract, and the cities in particular, who hope to see the industries of Kansas multiply and prosper. Flood control is also of prime interest to nearly all of the larger cities of Kansas and is of equal interest to all the industries located in or near such cities. So it is difficult to separate the interest of cities and industries on the one hand, and on the other, their mutual interest in flood control, and an equally mutual interest in a dependable quantity of water during future years.

The water resources activities in Kansas which the U.S. Government has carried on up to the present time, have been confined largely to flood control and irrigation. In the detention dams designed for flood control, some measure of water conservation has been included in all cases. The total of all reservoirs constructed, authorized, and proposed, are theoretically sufficient to alleviate the flood on the major streams. Attention should now be turned to conservation of water. It is ridiculous to wait until a water shortage occurs and crash programs have to be invented to take care of immediate and pressing needs.

Water should be considered, not only as a basic necessity of the human race, but as a natural resource which should be developed and conserved in such a way that the greatest good can be derived from it. It has been found in many places that when known and reliable sources of water are available, population and industries are attracted thereto, and the use of water grows more rapidly than the planners can predict on past experience. So the fact that only a relatively few cities are in dire need of additional water supplies at this particular moment, should not deter the planning and construction of those structures which will aid in the developing and conservation of this natural resource.

The water resources board has launched a careful study and analysis of streamflows of the State, which will be available within a relatively short time. But based on a very general analysis of the available records, it will be found that a vast amount of water leaves Kansas every year which might be utilized for the benefit of people, both as individuals and in filing their needs through manufacturing activities. The minimum of such outflow is 1,675,000 acre-feet, while the maximum quantity to leave the State in any 1 year was 36,100,000 acre-feet, the latter being in the flood year of 1951. These figures emphasize the extreme conditions that obtain in this area between years of extreme drought on the one hand and of excessive moisture on the other. A rough approximation of the yield which might be obtained from these streamflows by means of storage reservoirs is 4 million acre-feet. Due to the variation in rainfall, streamflow and temperature, to make 4 million acre-feet of stored water available each year would require a total storage capacity of about 11 million acre-feet. This, incidentally, is just about twice as much storage capacity as is represented by all the flood control and irrigation reservoirs that have heretofore been constructed, approved, or proposed, to date, by the Federal Government.

Four million acre-feet of firm supply would be enough water to provide for an additional 4 million inhabitants and, in addition, would provide sufficient water for about 10 times the total manufacturing activity now to be found within the State. Even on the basis of past records, Kansas should be prepared to support a population of 6 million people within the next 100 years. We therefore suggest that this plan be adopted as a 100-year program, that it be put in operation by constructing 1 percent, or 110,000 acre-feet of storage each year. Before the need becomes pressing, each such storage reservoir could be operated for flood control and recreation, and as soon as the need developed, the users should start repaying the original cost over a reasonable length of time. The first cost could be repaid over a 40-year period at 4 percent, at the rate of $5.05 per acre-foot per year, which is within the range of costs now considered entirely reasonable. As a direct contribution to the welfare of the Nation, it is suggested that these repayments be applied directly to the public debt.

The topography of Kansas is such that there are no ideal damsites. The least objectionable have already been selected and used. It would be most beneficial to future generations if a program could be planned for at least 10, or preferably 20 years in advance, the sites chosen and restrictions placed thereon so that additional construction could not render them less valuable when the time came for actual construction.

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It will be to the best interest, both of the State and the Nation, if all dams, wherever planned, and for whatever the immediate purpose, be designed as large as topography will allow, or big enough to contain more than the normal runoff from the tributary drainage area, whichever criterion might apply. Thus, each flood control reservoir should be designed with as large a volume of conservation storage as possible, with provisions that this storage can be made available for the use of human beings whenever the need is such that they are willing to pay their share of the cost of construction.

We respectfully submit for your consideration a program of the general type outlined above, which will enable this section of the country to care for its proportionate share of the potential increase in population, and thereby make its proper contribution to the continued welfare of the Nation.

STATEMENT FROM THE CITY OF MARION, MARION COUNTY, KANS.

Gentlemen, the city of Marion being vitally interested in the formation of your committee and believing that it is a committee that is very necessary and important in the matter of water conservation and flood control wish to give the following facts to this honorable body for your consideration.

The city of Marion is located in Marion County, Kans. The first pioneer settlement was made in Marion County in the spring of 1858, and Moses Shane built the first cabin in what is known as Marion County, Kans. The first formal organization was in 1865 and the first election was held in August of 1865. W. H. Billings, J. Wise, Sr., and Levi Billings were appointed county commissioners and were later elected in August of 1865. The first post office in Marion Centre, now city of Marion, Kans., was in 1862 and W. H. Billings was the first postmaster.

In November 1866 the present site of the city of Marion, Kans., was formerly made.

We give you the above history in order that you may better understand that the city of Marion, Kans., was one of the early towns in the State of Kansas, and has always been a thriving community, and played an important part in the history of the great State of Kansas.

Attached to this statement is a map of Marion County, Kans., and a map of the city of Marion, Kans., in order that you may be better advised as to our flood conditions.[1]

The city of Marion, Kans., is the county seat of Marion County, Kans., with a population of approximately 3,000 people.

We have been plagued with severe floods for many years, and in 1951 there was approximately 8 feet of water on our main street, and upon this street is located 95 percent of our business houses. You will note from the attached maps that the Cottonwood River originates in Marion County, Kans., and that the Cottonwood River, Mud Creek, and Clear Creek junction at or near the city of Marion, and the three creeks drain a great portion of Marion County thereby causing a tremendous amount of water which causes our flood condition.

The Army Engineers have made a survey of this community and have presented their recommendations which consists of building a dam northwest of the city of Marion on the Cottonwood River, and some dikes around the city of Marion, and some changes in the channels of Mud Creek, and Clear Creek. The engineers feel sure with these changes as per their recommendations floods in the city of Marion, Kans., and the flooding of much fertile land on our river bottoms could be prevented, which would greatly assist our farmers in the preservation of their crops. This is a very fertile valley, and wheat, corn, alfalfa, and all small grains are grown by our farmers.

Such dams would serve a double purpose, as they would impound the water for domestic purposes in any drought year, as in dry seasons we have a water shortage in the city of Marion. Such dams would also create a fine fish and game refuge.

We will greatly appreciate your sincere consideration of our problem here in Marion, Kans., and any consideration you may give this community will be greatly appreciated, as it would not only help here, but would help all towns along the line and located on streams into which eventually all this water flows.

The attached exhibits marked "A" and "B" (maps) are made a part hereof for your consideration. We feel sure that the Army Engineers who have made a

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[1] Maps were placed in committee files for reference.

survey and study of this community will verify the above statements, and will be able to give you additional facts as to our water problem. Thanking you for your consideration, we remain,

THE CITY OF MARION, KANS.,
By IRA NEWCOMER, *Mayor.*
EARL C. HOUSTON, *Commissioner.*
PAUL H. KEAZER, *Commissioner.*

Senator SCHOEPPEL. The next group of witnesses we will hear is the general statement concerning water and industry. The coordinator is George Lister of Ottawa, Kans., chairman, Kansas Industrial Development Commission.

The CHAIRMAN. Mr. Lister, we are glad to have you here today.

STATEMENT OF GEORGE LISTER, OTTAWA, KANS., CHAIRMAN, KANSAS INDUSTRIAL DEVELOPMENT COMMISSION

Mr. LISTER. Mr. Chairman, Senator Schoeppel, my name is George E. Lister, of Ottawa, Kans.

I am speaking today for the Kansas Industrial Development Commission, of which I am chairman.

The duty of our commission is to promote the industrial development of the State of Kansas. Our responsibility in the water resources program of Kansas encompasses the entire State, but is, we feel, limited to the area of encouraging recognition of the increasing dependence of our State on industrial development and the resultant increasing demands of industry on water.

Census figures projections show Kansas with an increase of population of 16 percent over present figures by 1969. This is some 3 percent below the predicted national increase of 19 percent, but attainment of even the predicted 16 percent increase is going to depend upon further industrialization.

The cities in Kansas that have been experiencing population growth in recent years are almost exclusively those cities which are growing industrially.

It is, therefore, paramount that in the face of a declining farm population and declining farm job opportunities, that we focus attention on making our State attractive to industry.

Significant in this program is detailed information on available water supplies. The area is being well handled by our State agencies.

Fortunately, the Kansas Legislature has evidenced a great interest in water resource problems and has backed up its interest with appropriations for comprehensive water resource factfinding, and for the preparation of plans which will direct the course of water resource development, conservation and utilization.

The work of the State data collection and factfinding agencies has been excellent. We subscribe to the report submitted this morning by the Water Resources Board of Kansas.

But the responsibility for development of water resources for the benefit of entire valleys and regions must necessarily be the responsibility of the Federal Government. The problem becomes too vast for handling by local, or even State interests.

Rivers have their beginning, in many instances, in one State, then flow through other States to reach the oceans from still other States.

The Federal Government should have the responsibility for improvement of entire valleys and regions through river development,

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but the responsibility for taking water from the streams should be that of municipalities and industries.

Municipalities and industries should provide their own impounding pools within river channels and their own pumping facilities and distribution facilities.

To assure such a stable supply of water in as many valleys of the Nation as possible, the work of the Corps of Engineers, the Bureau of Reclamation, and the Soil Conservation Service should be continued under the directives of the Congress. These agencies in cooperation with others have proved the value of a diversified program.

The physical work of developing the rivers of the Nation is in the hands of qualified Federal agencies. Improvement of the rivers for navigable purposes cannot be overlooked in the field of industrial development and so should be continued.

The general feeling of the Kansas Industrial Development Commission is expressed in a resolution which was adopted February 17, 1958, and which is appended for the record.

In behalf of the commission, and for myself, I would like to express our appreciation for this hearing.

Mr. Chairman, I would like to have the resolution for the development and conservation of the water resources of Kansas passed by the Kansas Industrial Development Commission on February 17, 1958, become a part of the record.

The CHAIRMAN. Yes. It is so ordered.

(The resolution referred to follows:)

KANSAS INDUSTRIAL DEVELOPMENT COMMISSION

RESOLUTION FOR THE DEVELOPMENT AND CONSERVATION OF THE WATER RESOURCES OF KANSAS

Whereas the Kansas Industrial Development Commission recognizes the importance of developing the water resources of Kansas for flood control and water conservation in order that our State can be in a better position to attract new industry; and

Whereas many industries have indicated that a guaranteed water supply and flood protection is one of the prime considerations which determine the location of their plants; and

Whereas the occurrence of devastating floods, followed by the periods of extreme drought in recent years has demonstrated to the people in Kansas the imperative necessity for the control and conservation of our water resources in order that water may be available when needed for beneficial use and not wasted through destructive and catastrophic floods; and

Whereas the control of major floods and the impounding of water in sufficient quantity to meet the ever-increasing demands of industry can only be accomplished by the completion of the comprehensive plans for water conservation and flood control which have been authorized by Congress and which will be proposed by Federal and State agencies for future authorization; and

Whereas the completion and carrying out of these plans so vitally important to the welfare and prosperity of our State has been delayed by misunderstanding and lack of appreciation of their character, purposes, and potential benefit: Now, therefore, be it

Resolved, That the Kansas Industrial Development Commission hereby pledges its support and cooperation to the Federal agencies charged with the responsibility of developing the water resources of our Nation, namely, the Soil Conservation Service of the Department of Agriculture, and the Bureau of Reclamation of the Department of the Interior, and the Army Corps of Engineers in the Department of Defense; and be it further

Resolved, That this Commission urge the Kansas Water Resources Board and other State agencies to consider the value and importance of the early comple-

tion of the authorized and recommended water control projects in our State without exception in order to place us in a more favorable competitive situation with surrounding States to attract desirable industry in order to create a better balanced economy in our State.

I hereby certify that the above resolution was passed by the Kansas Industrial Development Commission on February 17, 1958.

GEO. E. LISTER, *Chairman.*
MURRAY HODGES, *Vice Chairman.*
JOHN H. STICHER, *Director.*

Mr. LISTER. Now, Senator, I would like to introduce to the committee Mr. Chris Green, of the Kansas State Chamber of Commerce.

The CHAIRMAN. All right, Mr. Green, we will be glad to hear from you.

STATEMENT OF CHRIS GREEN, COURTLAND, KANS., CHAIRMAN, WATER RESOURCES COUNCIL, KANSAS STATE CHAMBER OF COMMERCE

Mr. GREEN. Mr. Chairman, and members of the committee, my name is Chris Green. My home is in Courtland, Kans., where I am president of the Swedish-American State Bank.

I am presenting this statement on behalf of the Kansas State Chamber of Commerce as the chairman of the water resources council of that organization.

The Kansas State Chamber of Commerce is a voluntary, nonprofit organization with a statewide membership of approximately 3,000 individuals, business firms, and associations in the State of Kansas, representing practically every segment of the State's economy.

We believe that one of the most serious unsolved problems facing the Nation and the people of Kansas today is the proper development and control of our water resources. The future economic life of Kansas and the Nation rests on the development and applications of sound water management programs in the two basic fields of water control and water supply.

Expanding population, agriculture, and industry, will require in the next 20 years use of water somewhere between 50 and 250 percent more than persent use.

Therefore, your committee, we think, is to be commended for undertaking the forward looking study contemplated in Senate Resolution 48.

As pointed out by the Second Hoover Commission, development of sound Federal policy for water resources is of fundamental importance to the national economy.

Furthermore, under the commerce clause of the U.S. Constitution, as interpreted by the U.S. Supreme Court, the Federal power to regulate commerce embraces navigation, flood protection, watershed development, and related activities.

It is clearly in the national interest, then, for Congress to establish a national water policy, stemming from these powers and responsibilities, which will meet broad national needs, with full recognition of varying State and local needs.

Kansas is a growing State, and as it grows its water problems become more intense.

The State's population, which for decades remained relatively static, at about 1.8 million, has recently climbed above 2.1 million.

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If current trends continue, Kansas, according to national estimates, will have a population of about 2½ million by 1970, and possibly 2¾ million by 1980.

Merely to maintain our standard of living for a growing population, therefore, we shall need to husband our water resources and manage them wisely.

This expansion of population has come about in the years since World War II. It has been occasioned primarily by the creation of additional job opportunities, particularly in the basic wealth creating industries.

An indication of the progress made toward balancing agriculture with industry can be gained by a comparison of total agricultural employment with manufacturing workers.

In 1946 in Kansas, there were three workers on the farms for every one in manufacturing.

By 1956 for every four agricultural workers, there were three engaged in manufacturing.

In recent years industrial payrolls have been the largest single contributor to Kansans' personal income.

Total employment in Kansas is expected to rise from the current level of about 800,000 to approximately 1 million by 1975 if present trends continue. Such predictions are made even though the long-term trend in agricultural employment is downward, or at best stabilized

Estimates indicate that industries in Kansas withdraw about 870 million gallons of water per day from privately developed sources. By 1975, industrial water use is expected to be 2,190 million gallons per day, or more than double present usage.

In order to sustain our normal population growth and to maintain our present standards of living, Kansas must create at least 15 thousand new jobs annually, at least 30 percent of which should come from the manufacturing industries.

It is only through development of basic job opportunities which create new wealth that Kansas can build a solid economic growth.

If Kansas is to achieve its expected and desired goals of economic progress, the wise development and conservation of our key resource and remaining frontier—water—are needed.

Water is certainly one of the basic factors in industrial location. Not only must prospective industries be assured of ample supplies for their individual needs and sufficient streamflow to dilute treated wastes, but these same job creating industries, both established and prospective, must be protected from devastating floods.

In addition, industry more and more is also sizing up recreational opportunities for its employees as a factor in industrial location, and such recreational facilities often center upon water.

In 1956, the committee on labor and industries of the Kansas Legislative Council held a series of hearings around the State for the purpose of determining what the State should do to stimulate further industrial development.

Among the major suggestions received in all such hearings, emphasized repeatedly, was the need for concentrated attention on water resources management and conservation.

Other speakers today have been enumerating the recent forward strides made by Kansas in putting its own house in order by providing

the administrative and legal machinery for furthering water resources development.

Passage of the Watershed District Act, creation of the State water resources board to spearhead statewide planning, modification of the water rights laws, and adoption of a constitutional amendment in 1958 to permit the State to engage in works of internal improvement for water resources development, all have received support from those State groups such as the State chamber representing industry.

These actions well serve to illustrate the water consciousness of Kansans and their high interest in further development.

Now, generally accepted is the need for an integrated program encompassing all forms of water improvement works, as well as the need for partnership effort at all levels of government, local, State, and National, along with efforts of private, individual enterprise to achieve the integrated program goal.

Resolutions adopted in the three most recent sessions of the Kansas Legislature have petitioned Congress to take such actions as are necessary to insure continuance of surveys and planning and assure cooperation in the construction of projects in the State of Kansas that are vital and necessary to the conservation of land and water by the three agencies; namely, the Corps of Engineers, the Bureau of Reclamation, and the Soil Conservation Service of the U.S. Department of Agriculture.

Coming from the elected representatives of the people of Kansas, these resolutions demonstrate faith in the present Federal agencies entrusted with these programs.

Therefore, it may be seen that we have:

1. Proceeded to get our own local house in order; and

2. Have been equally concerned with promoting continuing Federal participation in this integrated program.

With regard to continued Federal participation, we would suggest these matters for your further consideration:

Most certainly Congress should expedite completion of those Federal water resource projects in Kansas which it has previously authorized. In so doing, Congress should insure the full coordination of those Federal agencies entrusted with these programs.

The annual water investment program should be set up on a scheduled, long-range basis, with clearly defined Federal and non-Federal responsibilities, which in turn will permit State and local long-range planning and follow through.

Ample precedent for this is found in the Federal highway program. Serious consideration should be given to the adoption of a schedule for the earliest possible completion of Federal projects in the Kansas and Arkansas River Basins.

At the same time, it is important that the full potential of the best Federal reservoir sites be realized. Flood control reservoir sites in Kansas should not be dissipated without full utilization of their water supply and recreational potential consistent with adequate flood control.

The Federal Water Supply Act of 1958 is recognized as a forward looking step which will permit local and State interests to participate in avoiding dissipation of Federal project sites without full realization of their potential for multiple use.

However, Kansas only recently—in 1958—adopted a State constitutional amendment which authorizes the State to participate in works of internal improvement.

It is important, therefore, that Federal authorities recognize the need for latitude and cooperation until State sentiment can crystallize with regard to contractual authority and determination of an equitable basis for repayment of financial assurance as required.

Storage supplies and rights to such storage will become increasingly important to Kansas.

In many areas of Kansas, ground water rather than surface water plays a more important role in industrial development.

In order that this potential might be more fully realized, it is recommended that additional State and Federal funds be allocated to the United States and Kansas geological surveys for more intensive ground water investigations.

Along with increased industrial development will be the need for further research in and programs for handling inorganic wastes discharged into watercourses.

Another area of research in which the Federal Government could logically participate concerns the developing of some standard by which to measure the economic value of water.

Needed is a yardstick analysis to explore the limits which water supply places on industrial growth and the potential economic growth which might occur given an increase in the firm flow of good quality water.

The need for such study has become increasingly apparent following passage of the Federal Water Supply Act of 1958.

The University of Kansas has made a good start on such a project and its efforts indicate that water storage projects can provide the potential for impressive economic growth, but that considerable additional research is needed. The results of such study should permit avoidance of underdevelopment of Federal water projects.

As an addendum to these remarks, I submit for your serious consideration the current policy declarations of the Kansas State Chamber of Commerce pertaining to water resources as developed by leaders from all parts of the State, which lend reinforcement to the testimony presented to you here today.

I might add that these are added to this report.

I am the director for Kansas on the Kansas-Oklahoma Association that met in Washington.

I thank you very much for this opportunity to appear before you.

The CHAIRMAN. Thank you very much, Mr. Green, for a fine statement.

(The material referred to follows:)

STATEMENT OF THE KANSAS STATE CHAMBER OF COMMERCE

WATER RESOURCES

This we believe:

The most serious unsolved problem facing the people of Kansas today is the proper development and control of our water resources. The very economic life of Kansas rests on the development and application of sound water management programs in the two basic fields of water supply and water control.

The overall objective of developing a water resources management program is to enhance the economic opportunity of the entire State— to improve the welfare of the peopple of Kansas. In developing a comprehensive program of water

management, consideration should be given to these elements of water resources planning, not necessarily in order of priority:

1. Watershed development
2. Flood control
3. Domestic, municipal and industrial water supply
4. Irrigation
5. Pollution prevention and abatement
6. Drainage
7. Recreation
8. Fish and wildlife
9. Sediment control
10. Navigation
11. Ground water recharge
12. Soil moisture

POLICY DECLARATIONS RELATING TO WATER RESOURCES

The chamber establishes the following statements as its policy on water management and solicits the support of the individual citizens and various official and unofficial groups and agencies in Kansas who are concerned with development, protection, and control of water resources, as well as the Congress of the United States:

(WR–1) Alleviation of droughts and control of floods are two closely related phases of water management—a satisfactory solution to either will have a beneficial effect in control of the other. Therefore, the chamber endorses all justifiable water conservation programs (1951—Feb. 24, 1959).

(WR–2) Flood control and conservation: A proper flood control and water conservation program must include a coordinated plan of soil conservation, reservoirs of a suitable kind on upper tributaries, suitable reservoirs to protect main streams, agricultural and municipal levees and necessary bank stabilization works, and it must recognize agricultural, municipal, industrial and recreational uses of water (1951—July 30, 1958).

(WR–3) Coordination of agency operations: The chamber urges the full coordination of: (*a*) The operations of the three Federal agencies concerned with flood control work—the Corps of Engineers, the U.S. Bureau of Reclamation, and the soil conservation agencies of the U.S. Department of Agriculture. Such coordination must exist at all levels of operation of these agencies (1951—July 30, 1958).

(WR–4) With respect to all river basins in Kansas, the chamber recommends:

(*a*) Appropriation by Congress of the funds necessary for such flood control, bank stabilization, channel improvement and agricultural levees for flood control purposes, soil and water conservation and irrigation projects as have been recommended by the Corps of Engineers, the Bureau of Reclamation and soil conservation agencies of the Department of Agriculture and authorized by Congress. It is stipulated that this recommendation includes only those projects which have been both recommended and authorized as of July 15, 1958, and does not constitute an endorsement of any other projects which are recommended or authorized after that date, until such time as the proper groups of this organization can give them the necessary study and consideration.

(*b*) Authorization by Congress for such flood control, bank stabilization, channel improvement and agricultural levees for flood control purposes, irrigation and soil conservation projects as have been recommended by the Corps of Engineers, the Bureau of Reclamation and the soil conservation agencies of the Department, as of July 15, 1958. Likewise, this recommendation also stipulates that only those projects recommended as of July 15, 1958, are endorsed (1951—July 30, 1958).

(WR–5) Cooperation with municipalities: The chamber pledges its cooperation with Kansas municipalities in their efforts to obtain adequate and safe municipal and industrial water supplies (1951—Feb. 24, 1959).

(WR–6) Soil conservation and watershed management: The chamber urges establishment of watershed districts and supports the most rapid extension of sound soil conservation and management practices possible, because they contribute to the control and conservation of water (1951—Oct. 24, 1957).

(WR–7) Valley authorities: The chamber opposes the establishment of any Federal valley authorities which would include Kansas (1951—Feb. 24, 1959).

(WR–8) Compensation for property owners: The chamber agrees that in determining the compensation for property owners who are displaced as a result of flood control works that consideration should be given to the current cost of assembling an economic farm unit; that consideration should be given to the intangible losses incurred by these property owners—similar to the price paid for goodwill in the sale and purchase of a business concern; and, that ample allowance should be made for moving costs (1951—Feb. 24, 1959).

(WR–9) Forecasting river flow: It is recommended that Congress provide sufficient funds to enable the U.S. Weather Bureau and the U.S. Geological Survey to secure all possible data from which the Weather Bureau may be enabled to forecast probable stage and flow of the rivers and to disseminate such information at the earliest moment to the interested people in any area threatened by the flood (1951—Feb. 24, 1959).

(WR–10) Support of water resources board: The chamber pledges its support to the water resources board created by the 1955 Kansas Legislature, and to all other governmental, public and private agencies and organizations working for the development of a sound water resources policy in Kansas (1951—Feb. 24, 1959).

(WR–11) State participation in Federal project development: The chamber endorses the basic policy of the State water resources board governing active and positive participation in Federal projects planning to expedite further progress in water resources development in Kansas (1956—July 30, 1958).

(WR–12) Development of State water plan: The chamber recommends that the State water resources board in cooperation with other governmental agencies continue with dispatch to prepare for each area of the State a basic plan for water resources development as directed by law, and that the Kansas Legislature provide adequate funds for this activity (1956—Oct. 24, 1957).

(WR–13) Internal improvement for the conservation and control of water: The chamber favors adoption of the proposed amendment allowing the State to engage in certain works of internal improvements for the conservation and control of water (1956—July 30, 1958).

(WR–14) Appropriation of water for beneficial use: The chamber recommends that no basic change be made in Kansas water law doctrine of appropriation for beneficial use, and that adequate funds be made available for effective and efficient administration of the water appropriation law (1956—Oct. 24, 1957).

(WR–15) Water conservation in reservoirs: Recognizing the need for more stable water supplies in drought periods, the chamber recommends that flood control reservoirs constructed in Kansas be utilized to the maximum extent for water conservation consistent with adequate flood protection (1956—Oct. 24, 1957).

(WR–16) Recreational use of lakes and reservoirs: The chamber favors the use of lakes and reservoirs in Kansas for recreational purposes wherever possible (Oct. 24, 1957).

(WR–17) Economic value of water: The chamber urges appropriate public or private agencies to undertake a study to determine a suitable standard for measuring the relative economic value of water to industry and to the overall economy of the State (July 30, 1958).

Mr. LISTER. Mr. Chairman, at this time, I would like to present Mr. Don W. Pray, representing the Wichita Chamber of Commerce, who will present a statement on behalf of that organization.

The CHAIRMAN. You may proceed, then, Mr. Pray.

STATEMENT OF DON W. PRAY, WICHITA, KANS., CHAIRMAN, FLOOD CONTROL AND WATER RESOURCES COMMITTEE, WICHITA CHAMBER OF COMMERCE

Mr. PRAY. Mr. Chairman, thank you.

My name is Don W. Pray. I am representing the Wichita Chamber of Commerce, and am serving as chairman of its Flood Control and Water Resources Committee.

The population of Wichita as shown by the official State census of 1959, is 242,131, within the city limits, and 321,503 in the metropolitan area.

Wichita is the largest city in the State, and it is likewise the State's largest industrial city, with a total employment of 123,700.

Much of the industry in Wichita is directly related to the national interest, since, located here, are the plants of Boeing, Beech, and Cessna aircraft companies, as well as McConnell Air Force Base, an important unit of the Strategic Air Command.

During recent drought years, Wichita's water needs and water consumption have been dramatically highlighted.

In 1943 the consumption was 5,837 million gallons but during the drought year 1954, the consumption leaped to 11,485 million gallons, with a maximum day peak of 61 million gallons.

Here in the arid region, to a greater extent even than in the industrial cities of the east, the per capita consumption has shown a rapid increase. We do not know what our consumption will be in 1980, but we think it will be at least twice the current rate.

It is our belief that the full development of all available water resources will be required to meet the demands of 20 years hence.

Estimates of water needs of future years probably cannot be met by any means less than the full development of every available water source.

For this reason, the Federal Government should take cognizance of all types of water development, including ground waters and polluted channel waters, not merely reservoirs.

Furthermore, all reservoir sites or other means for the accumulation or generation of water supplies should be developed to their full maximum potentiality.

We think it would be a fatal mistake to develop any potential water source to a degree less than that source was capable of producing, for the future may reveal that the completed works would have to be destroyed to make way for larger works of maximum capacity, to take care of future growth of our population.

In this regard, we have reference to capacity of reservoir sites and to treatment of waters which might be made usable by much treatment.

Since Wichita is located on the eastern edge of the western arid regions, with an annual average rainfall of only 30 inches, it is imperative that every possible means be adopted for the conservation and development of water resources, and it is our opinion this is a problem, not alone of this city, but of the Federal Government as well, because of the location here of establishments existing largely, or principally, in the national interest.

Furthermore, such additional water sources as are available to Wichita, being the construction of reservoirs upon the flowing streams of Arkansas River tributaries, would possess corollary values such as wildlife, recreation, flood control, navigation, and similar programs heretofore recognized by the Federal Government as being in the national interest.

At the present time, Wichita's sole reliance in water for industrial and municipal purposes, is upon the ground water supplies contained in the Central Kansas geological formation known as the Equus beds. Most of the other cities and towns of south-central Kansas likewise depend upon this and other similar ground water sources.

For this reason, it is our belief that the Federal Government should more actively engage in development looking to the recharge of these ground water formations, for, doubtless in this area of Kansas, as

well as in other parts of the Nation, they will constitute a major source of water supply.

Land and water management practices and policies should all subserve this purpose.

Ground water recharge is a national problem as fully and to the same extent as the development of river basins. The need for recharge methods is current in many areas of the United States.

It is our belief that Federal agencies should thoroughly study and research the problems of ground water recharge.

At the same time, the water needs of Wichita and this entire region require that full use be made of the few feasible sites for the impounding and storage of surface waters.

South-central Kansas is a region, the topography of which affords few reservoir sites that could be economically developed.

We believe that such sites as do exist should be developed to their maximum capacity and usage, and this, few cities can afford to do.

Therefore, such reservoirs should be multipurpose ones, the financing of which the Federal Government should assume with respect to the cost of all benefits accruing to the national interest, such as wildlife, recreation, river basins, flood control, downstream navigation, and perhaps pollution removal for the benefit of downstream areas along the parent river.

It should be sufficient that local interests reimburse the cost of water for municipal and industrial usage only.

Formerly, Wichita drew its entire water supply from the sands underlying the big Arkansas River. This water was then potable, but is no longer satisfactory for industrial usage due to increasing salinity and hardness.

It is our belief that the Federal Government should be active in finding an economical method of purifying such waters and should also take the lead and perhaps assume at least a part of the cost or removing pollution in entire river valleys.

Local areas should receive credit and assistance for cleaning up their waste waters, thus making them available for reuse downstream.

Wichita is located on the main stem of the Arkansas River, the waters of which, at this point, are highly saline and are not susceptible to economical treatment to improve potability by any means now known.

Downstream from Wichita on the Arkansas River and on tributaries entering it below the Kansas State line, there are 29 reservoirs proposed, authorized, built, or building. For the most part, these are dedicated to river navigation and flood control, with some incidental hydroelectric power.

On the Verdigris River in Kansas—a stream which flows into the Arkansas River near Muskogee, Okla., there are three reservoirs, with a combined capacity of 745,000 acre-feet of water, of which 675,000 acre-feet are dedicated to navigational usage and only 70,000 acre-feet available for municipal and industrial water storage and for pollution removal.

We think that, in the comprehensive planning for the development of the Arkansas River Basin, more attention should be given to the higher usage of eastern Kansas waters for such all important purposes as industrial and municipal consumption.

Between the confluence of the Salt Fork with the Arkansas River in Oklahoma, and John Martin Dam in Colorado, the Arkansas River and its tributaries are wholly untreated and undeveloped, except for flood control channel works at Wichita, Hutchinson, and perhaps one or two other points.

We believe that tributary streams within this great area, such as the Walnut, Little Arkansas, Chikaskia, Ninnescah, and others, must be studied and treated as a component part of the Arkansas-White-Red River Basins program and that this area would then be capable of yielding substantial amounts of water for municipal and industrial supplies, pollution removal and, we think, river navigation, as far upstream as Wichita.

We think that appropriate Federal agencies should take the lead in such developments.

On the Arkansas River there is an approved navigation plan to the environs of Tulsa, making use of the main stem of the Arkansas River from its mouth to the mouth of the Verdigris River, and thence up the Verdigris River to the town of Catoosa, a suburb of Tulsa.

This Verdigris River route was chosen because it was somewhat cheaper for this particular section of development than a route making use of the main stem for the full distance to Tulsa.

We think that this is not the cheapest way of developing the Arkansas River Valley as a whole, and that the decision was made without due consideration of the feasibility of carrying navigation to the important areas above Tulsa such as to Wichita, or at least to Arkansas City or Ponca City.

Congress, in authorizing a project, we believe, should not, in the interests of a relatively minor cost saving, adopt a position which would perpetually debar further development of the same kind into new regions.

Changed conditions, shifting population, new industrial settlement, change the entire picture.

We point out that no feasibility study of the possibility of navigation between Tulsa and Wichita has ever been made.

The Federal Congress should specifically define and lay down fixed rules for the division of costs between the Federal Government on the one hand, and State and local interests on the other, respecting multipurpose projects having both national and local support.

We think also that the Federal Congress should spell out the rules for qualifying for multipurpose projects on the part of local units of government participating in such multipurpose projects.

For instance, many projects have been authorized that will probably never be constructed, for the reason that various prerequisites that must be complied with by local units of government will not, or cannot, be met. Such projects constitute a contingent liability against the Federal Treasury that may never materialize in most cases.

Nevertheless, the existence of the contingent liability prejudices other worthwhile projects that might otherwise be authorized and constructed.

If the rules are spelled out in complete particularity, then local sponsors of, for instance, a multipurpose project involving municipal water supply, may prepare themselves for applying to Congress, and the Federal agencies, by first undertaking and completing these prerequisites.

They can and should put their own houses in order before asking for Federal assistance.

Finally, it is our belief that the Congress should create some type of water financing corporation which would have the power to issue bonds and negotiate agreements and undertakings with local interests for the development of multipurpose projects, which include local usage, such as municipal and industrial water supply.

The existence of such a financing corporation would simplify dealings between local units of government and the National Government and would reduce the trips to Washington and time required to secure additional appropriations with which to prosecute the construction of multipurpose works.

Thank you again, Senator, for allowing me this time and on behalf of the Wichita Chamber of Commerce; we certainly appreciate hearings of this kind.

Mr. LISTER. Mr. Chairman, at this time I would like to present Mr. Hanan D. Wedlan, who will present a statement on behalf of the Kansas City Chamber of Commerce.

STATEMENT OF HANAN D. WEDLAN, CHAIRMAN, NEW INDUSTRIES COMMITTEE, KANSAS CITY, KANS., CHAMBER OF COMMERCE

Mr. WEDLAN. Senator, I am here in place of Mr. Ellsworth Green.

I have a prepared statement which I will read.

The CHAIRMAN. Fine.

Mr. WEDLAN. My name is Hanan D. Wedlan, of Kansas City, Kans. I am president of G. K. Warehouses, Inc.

I am speaking today for the Kansas City Kansas Chamber of Commerce, of which I am chairman of the new industries committee.

It goes without saying that our local chamber is terribly aware of the past flood hazards on the Kansas River. We are also alert to the benefits which our community and trade areas reap from increased navigation and from added centers of recreation.

But these aspects of water resources and control are being presented by others. We wish to point up the urgent need for a guaranteed river flow to support our industry and to permit us to expand.

If a stranger could have seen—and smelled—the Kansas River in the summers of 1953, 1954, 1955, and 1956, he would never believe the awful story of the 1951 flood. The flow in the middle fifties was so low that the river seemed little more than a series of stagnate pools. The hydraulics experts assured us that 200 or 300 cubic feet per second of water was actually passing Kansas City—but it was difficult to believe.

Somehow we made it, but unless we are assured of more water in the future, our industrial potential has about reached its peak. This must not happen.

Since the big flood, we have seen quite a number of new industrial faces in the lower Kansas Valley. We have a fine native-born labor market, superb rail and highway connections, and nearby sources of raw materials.

Manufacturers are looking for just such a situation. There is a satisfactory answer to nearly every inquiry, except for water.

We have an efficient municipal water and light board.

But even this agency looks to the Kaw for part of its supply. Their new plant is in Armourdale. Our county population is pushing to the west up the Kaw Valley, as well as north along the Missouri. Every newcomer, be it a family, or a chemical plant, demands more water the year around.

Among these newcomers are the Coop Feed Mills, Santa Fe repair shops, Procter & Gamble expansion, Griffin Wheel Co., several chemical plants, and the Farmer's Union Elevator.

Their water demands must be met or we are stalemated, economically.

We are told, and our own investigations confirm the fact, that reservoirs in the Kansas Basin are essential to meeting our low-flow requirements. The local chamber is in full accord with the efforts of our State water board to see that some of the floodwaters are conserved.

This may take additional money, and legislation by the State. If such is required, we, as taxpayers in the eastern part of Kansas, will share equitably.

It is not appropriate for our organization to campaign at this time for a specific amount or location of water-impoundment. However, recent developments at the Tuttle Creek, Milford, and Perry Dam sites indicate that these are very good sources of extra water. If they are not the full answer, the proper State and Government agencies should be instructed to determine where additional sources can be found.

We are confident that such could be located, if necessary.

The main emphasis we wish to make is that of speed.

A dependable riverflow is needed in the Lower Kansas River within the next few years.

For the record, the size of the industrial development in Kansas City, Kans., should be noted. One negative yardstick would be the damage we sustained in 1951. It amounted to some $350 million. Such losses indicate our tremendous capital investment.

Today, the valuation of this flood plain industry is nearly a billion dollars. It has grown over 10 percent in 8 years. We say it is growing, but it can be easily stopped if the summer and fall riverflows aren't stepped up by 200 to 300 percent.

This is our request to your committee: See that the Kansas reservoir program is pushed ahead at the fastest feasible rate.

Thank you for this opportunity.

The CHAIRMAN. Thank you, Mr. Wedlan.

Mr. LISTER. Senator Kerr, at this time I would like to present Mr. Robert L. Williamson, who represents the Atchison, Kans., Chamber of Commerce.

The CHAIRMAN. Very well.

STATEMENT OF ROBERT L. WILLIAMSON, ATCHISON, KANS., MANAGER, ATCHISON CHAMBER OF COMMERCE

Mr. WILLIAMSON. Thank you.

I am here today representing the Atchison Chamber of Commerce and the Atchison city commissioners.

Atchison, Kans., being a small midwestern community located on the banks of the Mississippi River, is faced with a realization of a decreasing rural farm population and an increasing urban population.

This great shift in population which is noticeable throughout the Midwest, coupled with the rapid increase in the population of the United States, is necessitating the creation of new jobs through industrial development and expansion for the increasing supply of labor in the urban centers.

In planning the industrial growth for our community and, for that matter, northeastern Kansas, several problems become evident that are frequently related to water resources.

First of all, our particular area due to its hilly terrain has not lent itself to industrial development. So we are looking at adjacent sites.

But to develop additional landsites, levees must be constructed to insure flood control. Development of such areas is extremely important because the hilly terrain surrounding Atchison does not lend itself to industrial development. In some cases, the growth of existing industries is stymied because of the lack of usable landsites.

2. The influx of farm labor, the rate of population increase, the development of new industries, and the expansion of existing industries place a great deal of emphasis on the quantity and quality of our water supply.

The demands for an adequate supply of water continually increase for both domestic and industrial use.

To cite just one example, an existing Atchison industry uses 1,400,000 gallons of water per day. This industry anticipates using at least 2 million gallons per day in 10 years, and 2½ million per day in 20 years.

The industrial future and the economic well-being of the area may well be dependent on water resources within an alarmingly few years.

Atchison has completed the plans and will soon construct a sewage treatment plant. Other communities must be encouraged to accept this responsibility and build like plants. The purity of this great natural resource—water, is of extreme importance, again for both domestic and industrial use.

3. Development of this entire area will be largely contingent upon the Missouri River being navigable.

Two of Atchison's major industries were quick to take advantage of river transportation. Other companies are rapidly preparing to do likewise.

Several large companies are looking at Atchison as a potential midwestern wholesaling center. This is due to the prospects of river transportation and the fact that Atchison is the westernmost point on the Missouri River.

4. Atchison has recently completed a workable plan under urban renewal and has applied for an urban renewal project loan and grant. The execution of this plan, together with the approval and execution of our proposed watershed program, will afford much needed flood control for our community.

We hope we will never again be a disaster area, such as we were in July 1958 due to a major flood. With assurance of flood protection, our people will be in a position to rehabilitate their places of business and construct new buildings on sites which are presently unsightly reminders of the 1958 catastrophe.

This rehabilitation program which will incorporate a shoppers' mall will convert an old river town to a modern progressive city. City planning will continue long after the major reconstruction is com-

plete. We expect our modern city to be a great asset to industrial development.

5. Water resources applied to agriculture with reference to Atchison and industry is also of great importance. One manufacturer uses in Atchison 5,000 bushels of milo per day and anticipates 7,500 bushels of milo per day in 10 years and 10,000 bushels per day in 20 years.

We are on agricultural surplus area which again makes transportation of major importance.

How important are our water resources. Atchison, Kans., is just one of many communities whose progress is contingent upon the manner in which we manage our natural resource of water.

Progress and growth will come only as development of water resources is applied to flood protection of our potential industrial area, assuring adequate supplies of water, improving standards of purification, navigation development, the completion of the flood-control portion or urban renewal, the completion of the watershed program, and agricultural irrigation development and flood protection.

With proper scientifically based management, water will enable our Midwest area to flourish and contribute substantially to the national economy.

Since the problems involved in water conservation and development of water resources are interstate and regional in nature, the Federal Government must assume the leading role in the matter.

We, therefore, urge the Senators and other officials conducting this hearing to give serious consideration and vigorous support to promoting and developing our water resources rapidly to the fullest extent possible.

This statement is submitted jointly by the Atchison Chamber of Commerce and the board of city commissioners.

I would also like to say that these problems are not new ones in this area nor are they new ones in the Midwest. Many of them are being worked upon now and progress is being made through Pick-Sloan, but we would also like to encourage acceleration of this plan to its completion.

Thank you very much.

Mr. LISTER. We want to thank you, Senators, very much, for your time and coming to Kansas and hearing us.

Thank you.

The CHAIRMAN. All right, Mr. Lister.

The general statement concerning land and water, Coordinator Harold L. Smith, Topeka, Kans., commissioner of Labor, State department of labor.

Mr. Smith.

STATEMENT OF HAROLD L. SMITH, TOPEKA, KANS., COMMISSIONER OF LABOR, STATE DEPARTMENT OF LABOR

Mr. SMITH. Senator Kerr, Senator Schoeppel, and gentlemen, my name is Harold L. Smith, and I am presently serving as commissioner of labor of the State of Kansas, a department of State government, with my primary responsibilities in the fields of employment, safety, industrial and labor relations, hours of work, health, safe operation of mines, wages, and in general, with the welfare of the so-called wage earner.

The Kansas Department of Labor, through its research and statistics section of our employment security division, provides the State government and other interested parties, agencies, and firms with data concerning manpower trends, employment, unemployment—and areas of substantial unemployment—wages and salaries of nonagricultural workers, hours, gross earnings, turnover, and other valuable data.

The department of labor is in a position to supply this committee with data from which various economic conclusions can be drawn concerning selected areas of our State and for this State in general.

We will be happy to supply any information to you that is available.

I appreciate this opportunity to appear before this Senate committee and discuss with you our interest in providing an adequate water supply for the future growth of Kansas.

Without apologizing, I feel that the department of labor's presentation before this select Senate committee may not be as broad and as deep in perspective concerning our State's need for water resource planning, as it would otherwise have been if we would have realized we were to participate in the hearing.

With limited notice to develop and prepare our department's conclusions concerning the complex water problem and the implications it has on our future economic growth, my comments will possibly at best reflect only our genuine interest in all such developments. These statements of mine which are to follow should be viewed in this light.

I am by the very inherent characteristic of my background and as State official of the department of labor vitally interested in any water resources project that will provide the working people of this State with more job opportunities, better standards of living, greater enjoyment through outdoor recreation, and will aid in the furtherance of our children's education in respect to understanding and appreciating and preserving our wildlife.

With a nonfarm wage and salary employment in Kansas of approximately 560,700 at mid-September, of which more than three-fourths of this number is located east of State Highway 14, the department of labor is extremely interested in the water resources planning for the industrial section of the State. We are particularly interested in how it would increase employment as well as stabilize present job opportunities.

The importance of water and basin projects for a State's general progress can be drawn somewhat from Kansans participation in the Missouri basin which takes in approximately the upper half of our State along with 10 other States.

I want to point out a few growth indicators for the 1940–50 decade as benchmark for comparison later on.

In that decade the basin States had a population growth of only 5 percent, a little more than a third the national rate.

In employment and income growth the record was much better. Total employment increase at four-fifths the U.S. rate: nonfarm employment was even near the average; and in manufacturing, the regions record was clearly superior with a 54 percent growth in 10 years compared with 38 percent in the United States, both in the long run and in 1940–50.

Also, a conclusion was made that the basin area, including Kansas, had a net outmigration of more than a million residents during the decade.

I believe some of the typical inferences, felt if not spoken, have included the following: That the migration loss is a measure of the region's failure or inability to industrialize;

That it expresses a degree of agricultural population and for income loss which is undesirable, and that it also measures at least crudely, the loss income which could have been avoided had the population been retained.

I believe we can reasonably conceive that the southern part of the State would be affected by a water resources project—Arkansas River Basin projects—in approximately the same way.

Without water for industrial growth and recreation, we can expect outmigration of skilled workers, of Kansas educated children, to other areas, with the result of a loss of income in that area.

It has been pointed out that our three classic sources of economic life have not for some time been a source of new jobs to the degree that other industries have been.

Farm employment including self-employment on U.S. farms, has continued to decrease.

Mining employment in Kansas is declining.

Finally, although manufacturing employment has increased by about 13 percent since 1950, this is less than the gain in nonfactory employment.

All three of these basic industries you will note, are showing outstanding ability to maintain and increase production with fewer employees per unit produced.

Considering that a fairly large and important segment of our Kansas population is engaged in agriculture, and also realizing that the upper half of our State is in a basin project, we find a study revealing manpower requirements and incomes are declining in agricultural areas even when a watershed project is developed.

We can surmise that where such projects are not progressing as they should, a greater decline in income and population will result.

With reference to the 10 Missouri Basin States in 1950, 25 percent of the population of these States lived on farms. This quarter of our population had 19 percent of our income. Today, with 20 percent still on farms, they have only 12 percent of total personal income.

I have cited data from studies showing the outmigration pattern from an area in which we are part of.

Of course, outmigration is a measure of economic loss to us only if it is assumed we could of retained these people with no per capita loss of income.

Migration within this free country of ours is a delicate and sometimes not too successful device that tends to level the difference in income between areas, minimizes underemployment and unemployment variations, and presumably leads people to the places where economic and other amenities appear to combine to their best advantage.

I feel that when we secure the water resources to maintain continued industrial growth, and increase irrigation of farmland, we will have the necessary requirements to assure our State's economy a growth comparable with the U.S. average.

The concern of labor as voiced through the State Department of Labor with reservoirs, flood control, watershed areas and basin projects policies arises from the Department's goal of achieving maximum employment effective allocation, utilization and conservation of our manpower, and income opportunities for the people of the area.

We realize that alternative priorities in the use of water for power, navigation, irrigation, and flood control, can have varying consequences on such employment aspects of our State in respect to the continued migration of workers from farms to cities and our high winter unemployment surplus.

These economic effects comprise a factor to be considered in establishing the needs for further projects in this State.

I understand that the Webster units in Kansas will be completed in fiscal year 1961, and that construction will also begin on the Almena unit and Cedar Bluff unit in Kansas, and that continuing study and consideration is being given to Nelson Buck and Glen Elder units.

All of these projects are vital to our future agricultural development in view of declining farm prices, and to the furtherance of growth in agricultural associated industries.

It is important, however, that we give consideration to projects that would be beneficial to our State's eastern and southern industrial centers, where their continued growth is directly tied to an adequate supply of water.

We have the potential in these industrial centers to produce a vast variety of products and services that will encompass great masses of people and provide them with jobs.

The Cheney reclamation project near Wichita is a typical project in the southern industrial center of our State, and which will provide multiple benefits to our State and we urge Congress to complete the remaining necessary action as readily as possible.

It has been said many times that water reservoir projects have the capacity to stimulate economic growth of an otherwise undeveloped community and as irrigation and water supplies become adequate, industries begin to locate in the area, resulting in an ever increasing number of job opportunities for the population of that area.

We do believe that all projects should, however, be carefully coordinated with the overall river basin design to provide multiple-purpose projects when possible and to compliment or account for the type of waterflow that can be expected in that section of the country.

It, therefore, appears to us that it is a prerequisite in the development of a sound national water resources policy that coordinated planning at the municipal, State, regional, and Federal level be carried out to determine the maximum benefits that can be derived from any project in order that conflicting projects are not initiated.

Accordingly, we believe directional studies and planning programs involving basin project should be coordinated by an agency of the Federal Government with the findings of these studies sent to various state agencies including the Department of Labor in order that we may disseminate this information to the various organizations, for their enlightenment and support of needed public projects.

We realize the need for directional planning and find that Senator Schoeppel deserves the credit for the adoption of the water appropria-

tion act of 1945, establishing the first appropriations theory of water rights. This was one of the first actions that put Kansas in the right direction to approach our water resources problems.

The adoption of a directional study and planning program would permit an orderly and coordinated development of water and land resources programs by river basin States in relation with each other.

It would also appear to be beneficial to consider the principle of multiple-State administration of river basins through the device of interstate agreements by encompassing multiple administration we believe long-range water supply requirements will be held foremost and that consideration will be given to the maximum development of each reservoir's site.

We are extremely interested in the proposed Water Conservation Act of 1959 which was introduced in Congress by representative Trimble of Arkansas, and Senator Kerr of Oklahoma. We understand that under Federal procedures the development of maximum-use, multiple-purpose reservoirs results in economic benefits accruing to the Federal Government in an amount approximating $2 for each $1 of Federal cost.

Besides the economic value of such projects there is the recreation and social pleasures that these projects bring the community, providing higher standard of living and less juvenile delinquency at the same time providing fish and wildlife conservations points that would supplement the chain of reservoirs in Central-North-South migratory bird flyaway.

The Department of Labor is primarily in a position to furnish information concerning the labor market, trends in employment, hour and earnings, and the like, which are of more than ordinary importance from the standpoint of any basin project.

The Department provides assistance to community economic development programs and gives job guidance aid to young people and other workers who are faced with the need to choose careers for their working life or change those they have had.

We are also principally devoted to analyzing and reporting imbalances of labor supply and demands which bear on industrial location and need for reservoir projects.

Furthermore, we are advised that the U.S. Department of Labor is making funds available to State agencies for research and expanded operation in such fields as listing and describing occupational resources of communities, measuring the amount of agricultural employment and the use of farmworkers in nonfarm jobs, and trends of economic growth and decline by industrial components of the economy for whole States and for communities within basin projects.

I feel sure that we add reservoirs, and flood control projects that compliment the overall design of larger basin projects we will develop an economic stimulus in this State that will more than repay our indebtedness to the U.S. Government.

This State of ours with an adequate water supply has all the potentials of being an agricultural and industrial oasis.

Mr. Chairman, I would like at this time to introduce to you Mr. Floyd Black, the executive secretary of the Kansas State Federation of Labor, AFL–CIO.

STATEMENT OF FLOYD BLACK, TOPEKA, KANS., EXECUTIVE SECRETARY, STATE AFL–CIO

Mr. BLACK. Senator Kerr and Senator Schoeppel, the statement I would present will be in general, and I think very brief.

The Kansas State Federation of Labor, AFL–CIO, is delighted to have an opportunity to express our views on water resources, flood control, and water conservation.

We have consistently advocated the importance of maintaining an adequate supply of water, harnessing the flow of water, and preventing disastrous floods.

Water is an important factor in maintaining our present industry and attracting new industry to Kansas. Water is used by most industry in the course of their production. It plays a major part in making adequate power available, and, of course, is absolutely necessary in our homelife.

Industry, in seeking a suitable location, is concerned with the available supply of water for their employees, for production, and recreation.

We see the need for an increase in the number of State and county lakes that will serve three purposes:

1. Conserve our water supply
2. Provide recreational facilities for the citizens of Kansas.
3. Conserve the fertile soil of our State.

We also believe that large dams are necessary to conserve and maintain an adequate supply of water for industry, the communities, and irrigation.

The large dams can also play a major part in the elimination of damaging floods.

An adequate water supply through proper storage facilities can serve as a guarantee against droughts and disastrous floods.

The State of Kansas, with an ample supply of water and reasonable control of the water runoff during rainy seasons, offers a very favorable location for new industries. The many natural resources make it attractive for the location af various types of industries.

The wholesome labor supply that we have is also an inducement to industry to favorably consider Kansas.

Kansas has good transportation facilities and plenty of power.

The future economy of the State, however, rests upon the water resources. We also have many communities that have been in distress, and some are still in distress, because of a shortage of water for industrial use, and particularly for home consumption.

You no doubt will hear from several communities in Kansas with a particular water problem and the Kansas AFL–CIO is concerned with each and every one of these situations.

The State can, in a limited way, offer some relief, but we feel that the U.S. Congress will have to lead the way.

We recognize that the U.S. Congress must consider all of the 50 States in their legislative measures, but we hope that the group appearing before this committee will give you a thorough and descriptive picture of the water problems in Kansas.

We have confidence that this committee will look favorably upon helping Kansas develop an adequate water resources program.

Thank you for your attention.

The CHAIRMAN. Thank you, Mr. Black.

Mr. SMITH. At this time I would like to introduce Mr. Hobert Auer, who is substituting for Mr. Cogan on the program today.

Mr. Auer is the vice president of the Oil Chemical and Atomic Workers Union, AFL–CIO, local 5246 of Augusta, Kans.

The CHAIRMAN. We are very glad to have you with us.

STATEMENT OF HOBERT AUER, VICE PRESIDENT, OIL CHEMICAL AND ATOMIC WORKERS UNION, AFL–CIO, LOCAL 5246, AUGUSTA, KANS.

Mr. AUER. Honorable Senators, my name is Hobert Auer, and I am making this presentation on behalf of organized labor in Kansas, and specifically on behalf of my local union.

Without being immodest, I feel that I have personally over the period of the last 6 or 7 years, been very directly concerned with the local problems in Kansas relating to flood control and water conservation, particularly insofar as it affects the industrial use of water, and by virtue thereof, the welfare of persons employed in industry in Kansas.

During the period of time I was a city councilman for the city of Augusta during the critical days when the emergency water lifeline was built to the Arkansas River at Mulvane. During this period of time I have been and am now serving as secretary and director of the 21st district Mo-Ark—Walnut Valley Basin. I am director of Mo-Ark and a director of the Arkansas Basin Development Association, and have served two terms as a member of the city planning commission in Augusta.

The period of 1945 through 1956 has seen the use of domestic water in south central Kansas more than quadrupled; this coupled with the estimations of similar increases in domestic demand during the next 10 to 15 years can leave no doubt but that in emergency situations during drought periods, domestic and municipal use of water will have a priority over industrial use.

It, therefore, goes without saying that the curtailment of industrial progress because of the lack of water creates an unstable situation insofar as labor work forces are concerned.

No one has ever considered the State of Kansas as an arid or semi-arid State; in fact, the average rainfall in south central Kansas for the past 35 years is 31.36 inches.

The problem is not one of average rainfall, but is, rather, one of conservation and the storage and movement of water to the right places at the right time.

For example, compare this average rainfall to the year 1951, in south central Kansas, when we experienced 52.74 inches of rainfall and yet in the very next year, 1952, this rainfall dropped to 18.25 inches and embarked the area from which I come into the great drought of 1952 through 1957.

It has been estimated by competent sources that less than 20 percent of the rainfall in Kansas is actually conserved within the territorial limits of this State.

The reason for the lack of conservation is obvious. During periods of flooding, most of the runoff water passes on into Oklahoma, Arkansas, and Missouri.

The present lack of conservation is demonstrated by the fact the average drought losses in Kansas are said to have been $75 million per year over the last 20 years and flood losses during a similar period to $35 million per year.

I consider myself to be a native of south central—Wichita, Kans., industrial area, which we all know has had a spectacular economic growth and commensurate therewith, a rise in employment opportunities.

We are fearful that a steadily declining amount of new industry will be started in this area and opportunities for employment on a stabilized basis will decline unless we can first conserve and regulate our water resources.

South central Kansas has been said to have triple plated economy, agriculture, oil, and industry.

There is no doubt but that the interests of these three groups are compatible in urging that we bolster our economy through the development of water resources.

If this is accomplished those of us engaged in the industrial work force will obviously aid in anyway possible toward this goal, thus assuring security of employment and a steady market for our services.

It goes without saying that the organized labor groups in the State of Kansas are vitally interested in the problem I have mentioned, and we feel that the action of the U.S. Senate in conducting these hearings is a major step forward in conquering the water problems in the Middle West, and will ultimately effect a closer coordination between governmental agencies in determining the merit of water resources projects and thereafter the construction of worthwhile projects.

Thank you, sir.

Mr. SMITH. Senator, there were independent unions that asked to be represented here today. On behalf of the Kansas Department of Labor, I want to thank you gentlemen for inviting us to present our opinions to you.

On behalf of Mr. Auer and Mr. Black, I thank them for their participation.

Senator SCHOEPPEL. We appreciate you and your associates here presenting your views for the consideration of this committee.

Mr. SMITH. Thank you.

Senator SCHOEPPEL. It is important that we have all these views.

The next statement will be concerning the water and flood control. Lew Paramore and those people associated with Lew.

We are delighted to have you here and your associates to testify

STATEMENT OF LEW PARAMORE, TOPEKA, KANS., AREA MANAGER, MISSISSIPPI VALLEY ASSOCIATION

Mr. PARAMORE. Thank you, Senator Schoeppel and Senator Kerr.

It is a pleasure to appear before your select committee and in the interest of time we have been asked to confine our oral testimony to 15 minutes and at this time I want to assure you that we will make every effort to do so, Senator Schoeppel.

Senator SCHOEPPEL. Thank you very much.

Mr. PARAMORE. At the outset I would like to start by reading you a summary of the general statement that will be filed by Mo-Ark for all

of its 30 local associations, after which I will then present the speaker who will cover the oral presentation.

Because additional delay in the completion of the flood protection program in the Kansas, Arkansas, Marias des Cygnes-Osage, Grant, Chariton, and White Clay Creek Rivers, subjects these areas to additional flood threat which could result in damage of destruction of partially constructed flood control projects, and because each year that passes brings us that much closer to the next destructive and catastrophic flood, we therefore, urge the Senate Select Committee on National Water Resources to give favorable consideration to recommending to the Congress of the United States that a completion schedule be adopted for the authorized and recommended flood protection projects in these respective basins.

We further recommend that this completion schedule should not exceed under any circumstances, 15 years.

We are definitely in opposition to the creation of a Missouri Valley Authority as we feel the existing Federal agencies under the direction and supervision of the Congress of the United States are fully capable to carry on the recommended program of the basin in the most efficient and economic manner.

We urge the committee never to lose sight of the fact that water resources projects should be considered as Federal capital investments rather than current expenditures.

We are definitely opposed to any no new starts policy.

It is our feeling that no project can be properly classified as a new start when it is a part of an already developed comprehensive plan for water resources control in the river basin in which the project is located.

It is our conviction that if this program is to proceed to an orderly completion, it must have planning and construction on new basin starts each year.

To implement this program in keeping with good business management and to protect our own economy, nothing short of a shooting war should retard or delay the development and conservation of our valuable water resources.

We believe for reasons itemized in our statement that because of the effect of the flood control and water conservation program on the national economy, and because rivers recognize no State boundaries that the financing of this important program should continue to be a Federal responsibility with the rare exception of projects which are beneficial only to specific local interests.

Senator Schoeppel, at this time I would like to present a man who was mayor of Kansas City, Mo., from 1940 to 1947. He actively operates a sizable farm near Lawrence, Kans.

He is an active attorney in Kansas City. He is one of the founders and members of the executive advisory committee of the Mo-Ark Flood Control and Conservation Association.

He is a director of the Mississippi Valley Association, and a member of the Greater Kansas City Flood Protective Planning Committee. A man who for the last 10 years has devoted as much of his time as he could spare from his law practice in the interest of promoting the development of water resources in this midwestern area.

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He has served on the American Bar Association as chairman of the section of administrative law and through the 35 committees working under him there has been introduced congressional action to improve practice and procedure of the administrative branch of several Federal agencies.

But at this time I present Mr. John B. Gage.

Senator SCHOEPPEL. I am thinking about the time when we worked together on several occasions when you were mayor of your great city.

It is a pleasure to have you here and your associates, John, to testify for the record before us.

STATEMENT OF JOHN B. GAGE, KANSAS CITY, MO. (FORMER MAYOR OF KANSAS CITY, MO.), MISSISSIPPI VALLEY ASSOCIATION

Mr. GAGE. Thank you, Senator Schoeppel, and Mr. Paramore.

I do not appear here, Senator Kerr, or Senators from our States, Oklahoma, Kansas, and Missouri, to say anything about the water resources problem that confronts us or how to deal with it, because I know you understand it.

Men like Senator Ellender have a far more comprehensive idea of what it is all about and I do—than many men in the executive department of our National Government, also.

You have heard from other witnesses about their desires and the things that are necessary to maintain the economic well-being of this heartland of the entire Nation.

As Mr. Paramore has indicated, I have long been interested, because it is fundamental to our whole future out here, in this matter of water resources control, flood control, water conservation.

And I, of course, studied it as have others, such men as William Breidenthal, who sits back here, for many years.

I want to talk about the method, the apparatus that you use, a common expression—the organizational structures in government that may be best suited to accomplish that control, to get these projects across, to give continuity of action.

I am not talking about overall agencies or creating any new agencies. But I am talking about the things that Mr. Breidenthal and I have come to know about, through the long years of contact we have had with this problem on this committee, this flood planning committee, which was 25 years ago the product of the activity of a great national board authorized by Congress, created by the executive, directed toward some of the objectives that this special Senate committee intends to consider and that was the National Resources Board appointed by the President in 1932.

We are too prone to forget the things that have been done and well done, years ago in the way of planning.

The farmer does not go over the same ground again when it is once plowed and plowed right.

If it needs harrowing he takes a harrow. He does not go back with a plow and replow.

Let's go back to 1932 when this Board that had on it eight of the most distinguished engineers, hydrologists and businessmen of the Nation, was appointed and created its Water Planning Committee and went to work and had the resources of the Federal Government

back of it to employ a capable staff like this committee here has—engineers.

What happened?

They surveyed the Nation from the standpoint of water resources and the general situation. They came to the conclusion that the greatest national hazard in the Nation perhaps existed where the Kansas River flows into the Missouri at Kansas City and below Kansas City, and one that was possibly susceptible of alleviation by Federal action.

Without any local person talking to them they sent a man named Hanson to Kansas City, a technician, an engineer, to go over the situation and he discussed it with citizens, with men like Willard Breidenthal and others and went back to Washington.

Morris Cook, a great engineer, was the Chairman of the Water Planning Committee of the National Resources Board, and they discussed it.

He sent word to the men they had consulted, Hanson had consulted with at Kansas City, in October 1934, that the National Resources Board and its Water Planning Committee wanted to go ahead with a sound and complete and thorough investigation and study of the situation in the Kansas River Basin, as to flood control, because the Kansas River has been the wildest river perhaps in the Nation from the standpoint of the variation in its discharge and could subject lives and property to the greatest damage if it repeated its course in the future that it had followed in the past.

Well, so he sent a letter—Morris Cook—on behalf of the National Resources Board, to Kansas City and said, now you got to do your part, you should, there is a problem here that we have recognized that is as great as any in the Nation. We want you to create a group, not one or two, but it has to comprise the chambers of commerce of these four cities, some small, Independence, North Kansas City, Kansas City, Kans., Kansas City, Mo., and more in that area.

Consider all of those. They have to be the representatives of those political entities.

There must be representatives also of the industries affected, of the 13 railroads that use that great center; of the packing plants, of the factories, of the great wholesale and jobbing houses that have their places.

He sent that letter demanding that. He says it will require some local funds.

In October 1934 just 25 years ago in this month of November, Willard Breidenthal answered him and said that a local committee had been organized.

Well, it has been in existence for 25 years. It is still headed by Willard Breidenthal.

I have been a member of it for 10 or 15 years. What happened?

The National Resources Board said we are not going to proceed on uncertain ground. Of course, the famous 308 reports had been made by the Corps of Army Engineers surveying this whole Missouri River Basin, a great report.

They were not sufficient to satisfy the engineers and men on this committee. They said we want a detailed, complete, and thorough engineering and economic study made of the problem in the Kansas

River Basin, and that it cannot be done with our approval by any local engineers. It must be paid for locally.

So this local group, this planning committee consulted with them, with Morris Cook and others, as to who to get.

At that time, Frederick H. Fowler and associates, the leading hydrologic engineers of the Nation, and I don't believe there has been any engineering organization before or since that has been their equal, although a hydrologist engineer, Frederick was the president of the American Society of Civil Engineers.

He had working for him the men who had been accountable for the design and construction of the great Miami River flood control works in the State of Ohio that was successful and have been successful ever since in protecting those Ohio cities.

So that committee got in touch with Mr. Fowler whose headquarters was San Francisco. They employed him to make a complete study and investigation of the whole water resources flood control situation in this Kansas River Basin.

He went to work with his staff. Additionally, the national resources board brought into play the resources of the Federal Government. They commanded or directed the Corps of Army Engineers to cooperate in making that study complete, thorough, and accurate.

They made borings on many, many suggested reservoir damsites. It took almost 2 years to complete this report in which the recommendations were made for a combined reservoir and levee system stating that it was feasible, that the benefits would exceed the cost, that it should be done; that went to this water planning committee of the national resources board in the latter part of 1935.

They studied it and the board studied it and they were businessmen of ability and engineers.

They approved it and the board approved it and then after study the Corps of Army Engineers approved it and then it went up to the Public Works Committee of the House and Senate and they approved it.

Out of this report, in a way, came the Flood Control Act of 1936 when Congress categorically for the first time in a statute, although it had been in the Constitution, recognized its responsibility—the Federal responsibilty for flood control on the navigable inland waters of the country.

In that act the Flood Control Act of 1936 (still there is a declaration of Congress in the act of 1946), it stated that that is a Federal responsibility and that the menace of the destructive floods that affect navigable streams is something that the Federal Government is responsible to take care of where it is economically feasible and possible, within the limits of their ability to do so.

Now, what happened?

As I say, it was 25 years ago this month that this thing was started.

Looking back at it today, look at that report. Look at the latest recommendations as to the Kansas River Basin, that you get from the Corps of Army Engineers.

They fall right into that report and hindsight from a point 25 years in the future shows that every hydrological forecast, every climatological study set forth in here was acted upon and it estimated the cost of this system accurately.

As I say, the borings had been made for the damsites and that estimated cost was $179 million of the whole thing.

Here was Tuttle Creek, the Tuttle Creek Dam, the Perry Dam to the Delaware, the Milford Dam on the Republican all in there, and other dams.

The Corps was about to propose to Congress on these smaller tributaries.

What did Fowler say? He said you can take the three dams and they need levees. And you can meet a discharge rate and handle it in the river as far as the cities are concerned, equal to that of 1932.

But he said you can expect on the Kansas River according to my studies of it a much higher discharge rate.

Well, we got into 1951. We sustained a billion dollars in damages and the Federal Government lost in taxes more than twice the $179 million that it would have then cost to have done the entire job according to this engineering report and survey.

You have been told and you know better than I do what we are doing, what is underway now.

Tuttle Creek is under construction, planning money has been appropriated for Milford and Perry.

Naturally, we are concerned about delay. This has not, as we see it, been the fault of Congress. It has been the lack of continuity, the lack of consistent approach, and study; the lack of knowledge, if you please, on the part of the top level, on the executive side of government.

I doubt that anyone today in the Bureau of the Budget if you discuss with them the construction of these reservoirs would ever know anything about this Fowler engineering study or had ever heard of it and probably nothing about the work that was done or the reports that had been made by the national resources board.

And to this committee, I say that is not good government.

I believe Congress should retain in the fullest degree its legislative power. Your committees have public works of the days and weeks and months that they have devoted to hearing the testimony, from the Army Engineers and from other engineers, that relate to these projects come to understand them and understand the general situation to a degree no matter how good they are, that very few representatives in our government understand.

And they know the great returns that can follow from the expenditures they would like to make.

Of course, since this, since 1937 when that report went to Congress, events since have confirmed in every detail as to its engineering and its hydrological accuracy.

We have had intervening wars. We have had a lot of things come up to divert our attention, to absorb Federal funds, demanding upon demanding on Congress.

Now, there is only one thing where you could shave in any way this report. Fowler was not dealing, we were not thinking about the effect of drought. At that time the tremendous increase in the industrial and domestic consumption of water had not taken place and the demands for water in dry seasons were not as great.

But Kansas not only has experienced these terrifically catastrophic floods, but it has long periods of drought and extremely dry weather.

When the river flows are very low at times the Kansas River at Kansas City has gotten down to as low as 100 cubic-second-feet and in 1951 it reached a flow of 520,000 second-feet. The average flow is about 5,840 second-feet.

If you add those great variations you have, so tremendously important has become the other beneficial uses of conservation storage and your committees in Congress have seen fit to introduce that into these reservoirs and that if you also accomplish the necessary degree of flood control demands as large reservoirs as has been pointed out to you in previous testimony as are feasible and economic.

I know Senator Kerr, you studied the situation in Oklahoma and you have much the same condition as we, and have succeeded in meeting it very well.

Naturally, this is one of those situations where the chain as far as major floods is concerned is no stronger than its weakest link.

Until we complete this program a major flood can recur and do a far more damaging act than any which have been done in the past.

The only argument I have with the Corps of Army Engineers who are as competent an engineering service as exist anywhere in the world, is that they have always underestimated the benefits and they have done so, also, in the project they have completed in Kansas.

I think we, in this situation, need continuity of approach under the auspices of your senatorial committees.

I do not think any new agency is necessary as far as we can see, as Robert Moses frequently said, if somebody wants to kill off or delay a well designed project the best way to do it, and the easiest way to do it, is to suggest a new agency or a new committee to study it and restudy it.

We, therefore, recommend from our experience that for this case study, let your staff get the record of the National Resources Board, develop a continuity approach, if possible, in conjunction with the Bureau of the Budget that will plan this whole unified project down and appropriate so much each year for it until it is completed and the job is done.

And then, in this heartland of America, we may have something to serve us in the way of inland waterways that is as important to us as is the Rhine and its tributaries to the interior of Western Europe.

Thank you very much.

Senator SCHOEPPEL. Thank you very much, Mr. Gage.

The CHAIRMAN. I would like to say something.

In view of what you have said I thought the conversation that I had with the late Clyde Reed would be of some interest. He was a great man; a fine person. Senator Schoeppel and I went to the U.S. Senate at the same time. The first thing I did when I got there was to introduce a bill to provide for a study commission for the Arkansas and White and Red River Basins to make a complete anaylsis and come up with a comprehensive plan for the total conservation and development of soil and water resources of those two great river resources.

I know I had to have the support of Senators from other States. There were eight States involved.

I think I finally succeeded in soliciting 10 of the other 15, including Senator Schoeppel.

I had known Clyde for a long time. He had been down to Oklahoma City for some hearings and I was introduced to him when he was Governor.

I went to see him about going to bat for that bill. I was amazed at his reaction to it. He said, "Bob, there has been no flood control projects built in Kansas since I became a Senator nor will there be while I remain a Senator."

Mr. GAGE. Yes.

Senator KERR. That affected the continuity some.

Mr. GAGE. Things like that do.

However ill advised——

The CHAIRMAN. He was honest and sincere. One of the hardest jobs I ever had was to find a way for Andy and me to work together without him and create a new day on the water problem.

Mr. GAGE. I think so. That is to men like yourself and Senator Schoeppel and some others.

The CHAIRMAN. And these people here. This is what is going on all over the country. It is only through the development of this kind of a psychology, only through the pooling of information, only through the stimulus that comes not only to the Members of Congress, but to the people who are participating in these hearings and who read of the water problems and see them portrayed on television, are we going to build the necessary demand on the part of the American people that this continuity be established, and when established not again interrupted.

Mr. GAGE. That is correct, exactly what I hope occurs. It will be one of the greatest things to the country if we can do it, if it can possibly be done.

Senator SCHOEPPEL. I might say, Bob and John, that if many Members of the Congress had quit because of opposition for the movement many of these projects would still be in their infancy stages. That is why this type of hearings, set up by our distinguished chairman of this committee at the State levels around is, I think, the most constructive approach to this and gets down closer to the reality of what is going on and what can be effected and I think it is going to be very, very fruitful for the Congress to get their teeth into.

I know there is opposition of the expenditure of funds. This is something pretty important for us to figure on long range policy.

The CHAIRMAN. We are going to double our population in 40 years. That is within the lifetime of most of the women in this room. I see a lot of women running around here. We are going to double our industrial production and the industrial workshops that do that and the agricultural productivity areas that bring that about are going to be where the water is conserved, captured and utilized.

Mr. GAGE. Senator, if I can just trespass a moment on your time, we are not blaming the delays on the overall committee and there are few like it in the country. We know there has been opposition.

I remember once when I was mayor there came in my office a man whose name, I believe, was Sonderham. He gave me his card. He was with one of the biggest eastern engineering firms in the United States. He said, "I have been employed by the Association of Private Electric Power Utilities to study the big dam program of the Army

Engineers in this section of the country and Oklahoma, Kansas and on the upper Missouri. I would like for my use in that study to get some information from your public works department."

He apparently didn't know I knew anything particular about it and I didn't tell him.

I told him, "Yes, you may have that information. We studied what the Army Engineers are doing. We studied some ourselves. If there is anything wrong about their work approach or planning, we here in Kansas City want to know it. So we will give you that information, all of that you want, if you will promise me now to give me your report when you get through your study for the private electric utilities.

I never got that report, but I happened to be at some hearings down in Washington at one of the committees of the House or Senate, when he was, with one or two other engineers, employed by the same group, came in there to testify.

Well, the Senators, I believe, knew so much more about the subject than he and he was so wrong in his premises that you never saw an engineer testify on the stand so incorrectly and they told him so.

He was so embarrassed before he got out of there, before he got off that witness stand, at that committee hearing, we never heard from him again.

Today you say the attitude changed. We have private electric power companies supporting this program.

The CHAIRMAN. They are supporting it in Oklahoma.

Mr. GAGE. They are supporting instead of fighting it. Still their power and influence was great for a long period there. And there were other misinformed groups. They were working against their own interest.

The CHAIRMAN. It was not the opposition of the misinformed that was severe, but the ones that knew what they were doing.

Mr. GAGE. That may be a charitable thing to say.

Thank you very much. I am sorry to have taken up more of your time.

(The statement of Mr. Gage is as follows:)

STATEMENT OF MR. JOHN B. GAGE ON BEHALF OF THE GREATER KANSAS CITY FLOOD PROTECTION PLANNING COMMITTEE

My name is John B. Gage, residence, Kansas City, Mo. I appear here to present on behalf of the Flood Protection and Planning Committee of Greater Kansas City, to this committee in whose very important work we are greatly interested, facts which we believe will be of interest to you in connection with your study. We believe you are concerned, not so much with detailed information about local projects we deem essential to the national welfare and to adequate control and development of our water resources but concern yourselves, primarily, with whether or not the past approach to the solution of these problems and the Federal organizational methods and structures presently in use are appropriate and well suited to accomplish universally desired objectives.

We are prone to forget the history of the past and too often to lay aside consideration of the work that has been done or to go off on to new tangents that sometimes lead only to unnecessary delay. We follow without full regard for the facts, suggestions to create a new agency or committee or commission which may serve only to promote confusion and result in higher costs instead of lower costs.

As Robert Moses, of New York, the great planner and doer, has frequently said: "If opponents or objectors want to kill off a well designed and thought out improvement, just get a new committee or agency created to review and study it.

So, I propose to use as a guinea pig, so to speak, a case history of the development of flood protection as far as it has gone forward during the last 25 years in the Kansas River Basin. This won't take long—the story can be condensed. I do this because I believe that the facts relating to the development of flood protection in the great Kansas River Basin are unique and illustrate the character of the problems which confronted Congress over the years in many river basins and can well serve as a guide in the formulation of new legislative or executive policies if such are needed. Personally I do not believe any new organizational setup is needed or desirable. Our experience will demonstrate that new agencies are not needed. What may be needed is a new and better coordinated policy as between Congress as the legislator and the Executive at the top levels. We need to establish continuity of policy with respect to given programs. We need a policy that is not subjected to change or question in its basic principles with each passing year or event such as a change in executive administration. Congress starting with the Flood Control Act of 1936 declared flood control on navigable waters and their tributaries by Federal action is a proper activity and responsibility of the Federal Government and that destructive floods upon the rivers of the United States constitute a menace to national welfare (U.S.C.A., ch. 15, 33–7018) and it has done much and attempted to do more to implement that declared policy. From everything that we have seen here in Kansas and Missouri, what has been done has inured to the national benefit. The benefits locally and nationally have far exceeded those generally anticipated before the projects were completed. The organization I am speaking for here, the Flood Protection and Planning Committee of Greater Kansas City, is composed of representatives of the industrial interests, railroads, manufacturers, wholesalers, the chambers of commerce, as well as the political entities—four cities that center around the junction of the Kansas and Missouri at the Kansas Citys.

As a matter of fact the organization in 1934 of this group was the direct product of executive Federal activity authorized by Congress and it has lasted for 25 years. Many have forgotten about the work of the National Resources Board created in 1932 which comprised among its membership over eight of the leading industrial and civil engineers and businessmen of the nation. I doubt if you could find a man in the Bureau of the Budget today that is familiar with the work or accomplishments of this Board. Members of the Public Works Committees of Congress do remember it and it often constitutes the basis for their conclusions. The establishment of the Board was authorized by Congress, it was appointed by the President and had access to Federal funds to employ its technical staff. Of its own motion as a result of its investigation of past history of events it came to the conclusion that at the junction of the Kansas River with the Missouri River at the Kansas Citys and below Kansas City there existed the greatest menace to national welfare that could occur from natural causes anywhere in the Nation. It sent engineer members of its technical staff to Kansas City to study the local situation. It demanded that the organization which I represent here today be created. The local committee or commission, it said, must represent all groups, political, economic, private, and public. And, at its own expense, through local money it would raise it should employ the most highly qualified independent civilian engineer or hydrological engineering organization—not connected in any way with local affairs—to make a complete and thorough hydrological and engineering study of the Kansas River and the Missouri River below Kansas City with a view to determining if and how adequate protection against the flood menace could be achieved. The result was the raising of a very substantial fund locally.

The Corps of Army Engineers had at that time completed under the direction of Congress the famous 308 studies of the Missouri River Basin. These, however, the National Resources Board and its Water Planning Committee did not believe adequate or sufficient. Therefore the noted Frederick H. Fowler and his associates of San Francisco, the most outstanding organization in hydrological engineering this country has known was employed. Fowler himself had been president of the American Society of Civil Engineers, had done a great deal of successful work in Ohio and elsewhere on similar water problems. He was employed in 1934 and paid locally by this committee. Furthermore, the Federal Government helped through the Corps of Army Engineers with appropriations for the fieldwork that was done. Complete hydrological and climatological studies were made. It took almost 2 years to complete the job. It was submitted first to the Water Planning Committee of the National Resources Board and then to the Board itself. It was there carefully reviewed. It was also

filed with the appropriate committees of Congress. It played an important role in bringing about the Flood Control Act of 1936. We have a copy of that report. It was then and is now a sound, complete, and thorough hydrological engineering study of a given problem in a given area, the Kansas River Basin. It recommended the specific things that could be done and should be done. Its hydrological forecasts were sound. Every subsequent event that has happened in the last 25 years has served only to confirm the complete accuracy of its forecasts and specifications. It proposed a comprehensive plan of levees and reservoirs for the Kansas River Basin and for the Kansas Citys and on the Missouri in the area of the Kansas Citys. It received the approval of the Public Works Committees of Congress and subsequently the approval of the Corps of Army Engineers, when submitted.

The report locates the reservoirs. Borings had been made on the damsites to see if foundation conditions were acceptable. Cost estimates were made. The total cost of the entire system was $179 million, a system which if in its totality, had been completed prior to 1951 would have saved the U.S. Treasury at least twice that sum in income tax losses suffered by the Treasury as a result of one catastrophic flood which occurred on July 13, 1951, and caused over a billion dollars in damage. Just what the executive agency—the National Resources Board—and its engineers predicted might occur, did occur. The loss, however, was much greater than even they anticipated.

Our flood planning committee as well as other organizations through the years have urged Congress to make the specific authorizations and appropriations that are necessary to complete this overall plan. But wars have intervened which necessarily stopped work and caused people to forget and to turn to new things on which to spend moneys. A program of this sort no matter how sound is always subject to some attack from minority groups that do not understand it or think they have interests which are in conflict with what it seeks to accomplish.

Of course, as the engineering report points out that a really adequate degree of protection cannot be secured until all of the levees are in place and the reservoirs in operation. It is one of the situations where the chain is no stronger than its weakest link. Adequate flood protection against major floods will not exist until the whole work is finished. But with each segment of the work that has been completed there is, of course, a substantial degree of protection against the less violent or minor floods. Levees have been constructed in the Kansas City area. There has been local assistance in site provision and maintenance which in the long run will equal the Federal appropriations. There have been reservoirs built but some of them, while helpful, are not at the sites that Fowler selected.

The Tuttle Creek Reservoir on the Blue River is under construction and while the project will not be fully completed until 1962 or 1963 the reservoir will probably be sufficiently complete to impound some water in the spring of 1961. It is the largest reservoir in the system of reservoirs proposed by the engineer, Frederick H. Fowler, and recommended by the Corps of Army Engineers. Two other reservoirs, the next largest in the chain of reservoirs, have been authorized and planning money appropriated, namely, Perry on the Delaware and the Milford on the Republican. Appropriations for construction of these reservoirs have not yet been made. The six other reservoirs on smaller tributaries of the Kansas River have not as yet been authorized but are necessary to complete the overall plan as recommended by Fowler and the Corps of Engineers. Most, but not all, of these reservoirs are upon sites originally surveyed, studied, and recommended by Fowler in 1935. In 25 years there are some changes, naturally, which have to come about. Fowler was looking at the problem solely from a flood control viewpoint. Since he made that report there has been countrywide a tremendous increase in the demand for water for industrial and household purposes and although there have been recurrent floods in the Kansas River Basin there have also been severe and protracted droughts which have endangered the water supply and at times greatly curtailed it to many communities. Therefore water conservation storage reservoir capacity has become equally demanding as an added beneficial use of reservoir capacity. This means enlargement of the reservoirs to such extent as is economically feasible. The problem has, of course, engaged the attention of the Corps of Army Engineers and has been recognized by congressional committees.

Conservation pools have been provided for in the reservoirs recently authorized and they are very desirable. It is the opinion of our committee, shared, we believe, by every responsible organization that knows about the situation that Congress should review the final overall plan recommended by the Army Engineers for both reservoir and levee construction in the Kansas River Basin.

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It has reviewed and studied segments of the plan many, many times and then if it sees fit approve or authorize the construction of the remaining work to be done both on reservoirs and levees. The setting up of a suggested schedule of appropriations on the basis of the estimated cost which would complete the entire project within not more than 15 years would be most desirable both from the standpoint of economy and governmental policy. If possible the Bureau of the Budget should review the situation and at least tentatively agree on this program of appropriations. It should not be departed from except in the case of real Federal emergency. No new agency would be required. This is a Federal program that is necessary and will in all probability be self-liquidating from the standpoint of increased Federal revenues. This program is not only in the national interest but is clearly within the scope and range of the historic responsibilities of the Federal Government established not only by the Constitution of the United States but existing prior to the adoption of the Constitution in the Confederation of the States. It is a basic policy confirmed again and again by the Supreme Court of the United States as within the orbit of national power and responsibility. It was expressed in the acts of admission of the Western States that border on the great navigable rivers and their tributaries by reservations of powers in Congress.

It was incorporated in the provisions of the Northwest Territory Ordinance prior to the statehood of any States west of the Mississippi River. We believe that competent operating organizational structures exist whether it be in the given instance the Corps of Army Engineers or the Bureau of Reclamation or in some cases the Department of Agriculture. We know that the work entrusted to the Corps of Army Engineers has been most competently handled. No nation in the world has a comparable engineering organization at its service but it should be allowed to work on a long-range schedule so that the various construction projects can follow one another in an orderly sequence. The expenditures for reservoir construction on the upper Missouri River to which we of the lower river have been exceedingly favorable due to completions will encounter drastic decline. The Kansas River has been the greatest contributor to floods of any river serving anything like the same area in the whole of the United States. The National Resources Board was right in saying that it constitutes the greatest menace from natural causes to life and property when left uncontrolled of any physical feature in the entire Nation. Now the job lies ahead fully engineered, entirely feasible, sound and economic of completing the task, fulfilling a Federal responsibility recognized almost two decades ago not only by Congress but by the executive department of the United States through the work that was done and the action that was taken by the National Resources Board to which I have called your attention.

Do those who now propose new agencies to review or restudy the proposals know or realize that almost exactly what they seem to propose was done some 25 years ago—and that the results of the coordinated work it did—have been time tested and proven sound.

We have here copies of correspondence, telegrams, letters, reports and other data to fully substantiate the statements I have made. Willard Breidenthal who has been the chairman of our board or committee for a quarter of a century—still as active as ever in his leadership. We believe that there should be some enlightenment—some light thrown in the hidden caverns of the Bureau of the Budget—and that Congress should fully exercise its constitutionally granted legislative powers to make appropriations as well as authorizations for Federal expenditure on the public works relating to flood control and water resources. Its policy of requiring full expert engineering study of feasibility economic desirability, followed in the past should be adhered to. This is all in the opinion of our committee that is needed to accomplish the end objectives. And some day, not too far in the future, we will have a controlled inland waterway system here in the heart-land of the United States comparable to that of the Rhine and its tributaries in the heartland of Western Europe—and meaning as much to national welfare as the controlled Rhine does to Western Germany and Europe.

Mr. PARAMORE. Senator Schoeppel, I would like to present the balance by merely filing our statements for the record.

Senator SCHOEPPEL. We will be very glad to have them.

Mr. PARAMORE. First, a statement by Harley Cosby, president of the Walnut River Basin Association, Arkansas City, Kans.

Senator SCHOEPPEL. It may be received, and made a part of the record.

Mr. PARAMORE. Then we wish to have made a part of the record a statement by Lex Livingood, of the Wilson Reservoir Association, from Lincoln, Kans.

Senator SCHOEPPEL. It may be made a part of the record.

Mr. PARAMORE. We would like to have the joint statement filed by Emmet E. Wilson of the Verdigris Valley Flood Control and Water Conservation Association, and Frank Liebert, of Coffeyville, Kans., vice president of the Water Resources Division of the Coffeyville Chamber of Commerce and as a member of the Tri-State Committee of the Arkansas River Basin Development Association, made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. We wish to have the statement of Robert R. Irwin, representing the North Topeka Drainage Board, a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. Next we wish to have made a part of the record a statement by T. M. Murrell and John Fernstron.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. Next is a statement by Major C. Hager, of the Blackwater Lamine Flood Control Association, Salaina, Mo., which we wish to have made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. I have two statements, to file, Senator. One is for the association which I am a part of, and one from my board of public works.

Senator SCHOEPPEL. They will both be received and these statements will be made a part of the official record.

Mr. PARAMORE. Mr. Truman Schlup, of Kaw Valley Drainage Board, I believe, has two statements, he would like to present at this time.

(The statements referred to are as follow:)

STATEMENT BY HARLEY COSBY, ARKANSAS CITY, KANS., IN BEHALF OF WALNUT RIVER BASIN ASSOCIATION

Mr. Chairman and members of the committee, my name is Harley Cosby, and I live at Arkansas City, Kans. I am president of the Walnut River Basin Association, a voluntary, incorporated, nonprofit association, in south central Kansas.

The Walnut River runs approximately north and south through a rich basin, populated by about 75,000 people with many cities and towns along its route. The river's source is northeast of Wichita, in Butler County, Kans. and empties into the Arkansas River just below the city of Arkansas City, which is about 3 miles north of the Oklahoma line.

In this area we suffered huge losses created by floods—loss of our fertile topsoil—which is irreplaceable—untold losses to our farmers through destruction of crops, fences, buildings and livestock—losses to our counties and cities through destruction of bridges, highways, roads, and streets. During drought periods we have had serious curtailment of water supply for our industries, our municipalities, and our farmers.

During the past 14 years, since the 1945 flood, we have been endeavoring to get flood control and this effort has been accelerated by the drought years pointing to the necessity of water storage. The per capita use of water is three times what it was in 1900 and will double again by 1975. Washing machines, garbage disposals, millions more bathrooms, and the new trend for swimming pools soak up more and more of our available water supplies. This increased water usage

added to the great increase in population makes it imperative that adequate water storage be provided by construction of dams and reservoirs. Watershed districts are supplemental and a necessary part of the comprehensive overall program.

Our association is opposed to the "No new start" policy but as part of our national improvement program, we should develop our water resources and protect our industries, farms, and homes from flood damage and destruction.

The passing of the 1958 Flood Control Act permitting the Corps of Engineers to contract with municipalities for water storage will greatly facilitate matters as inadequate water supply in the Walnut River Basin is greatly needed. The use of surface water appears to be the most satisfactory method of supplying domestic and industrial water needs. The amount of ground water is limited and the quality in some areas is unsatisfactory.

The chloride content of the underground water supply in this area is continually increasing.

An emergency pipeline from the valley of the main stem of the Arkansas River from near Mulvane to Augusta and El Dorado was constructed during the drought period. This pipeline would be insufficient to supply water on a rationed basis for domestic use to say the least of industry. This is shown in the recent report prepared by Mobile Oil Co. at the request of the city of Augusta, which report is attached hereto and filed with this statement.

WATER REQUESTS

These cities have indicated water storage needs to meet their requirements over a 50-year period:

	Gallons daily
Arkansas City	25, 000, 000
Augusta	13, 500, 000
El Dorado	22, 000, 000
Winfield	15, 000, 000
Total	75, 500, 000

The cost of this water storage would be computed by the Corps of Engineers and spread over a 50-year period as provided by the 1958 Flood Control Act, the various cities paying their proportionate share of the cost.

Any excess water supply in the Walnut River Basin over local needs could be used to meet some of the municipal and industrial needs of the Arkansas River Basin south to the Keystone Reservoir above Tulsa, Okla.

An outline of the Walnut River system is contained in the AWR report and includes the following:

El Dorado Reservoir on Walnut River.
Augusta Reservoir on Whitewater River.
Douglas Reservoir on Little Walnut River.
Wingate Reservoir on Rock Creek.
Stream bank pumping for irrigation.

The project is a solution for the major flood, water supply and irrigation problems in the basin.

There are several fairly large cities and towns in the Walnut River Basin including: Arkansas City, Augusta, Douglas, El Dorado, Winfield, and several smaller towns and villages.

Principal industries include oil refining, flour milling, meatpacking, and some others all of which are directly related to the national interest in that they furnish large quantities of products necessary to successful conclusion in times of national emergency such as war.

FLOOD CONTROL

The Walnut River system would control runoff from more than a thousand square miles of drainage area above their damsites and would prevent nearly 80 percent of the average annual flood damages in the Walnut River Basin below.

RECREATION

There are few opportunities for recreation in connection with water areas in the Walnut River Basin. The nearest water area of any size is Fall River Reservoir. The population growth and shorter workweek in the basin and in the

Wichita area and other urban areas make it advisable that adequate recreational facilities be provided.

This need for recreational opportunities for recreation in connection with water areas would be met by providing a reservoir in the Walnut Basin. Because of the proximity to several centers of population, the reservoir would have intensive public use for recreational purposes.

Commercial leases of areas and facilities to provide services to the public are revenue producing.

PROGRESS

We have had one small appropriation of $20,000 to start the survey and study and have requested the Bureau of the Budget to include $40,000 for survey for fiscal 1961.

The feasability report is expected to be completed January 1960 and considering the rather large quantities of water storage requested by the several cities in this Walnut River Basin, we believe that a favorable cost ratio will be developed.

PRESENT SURVEY

The present survey investigation of Walnut River Basin is an interim study under authority of the House of Representatives public works resolution adopted October 16, 1951, which requested review of reports on the Arkansas River and tributaries, submitted in House Document No. 758, 79th Congress, 2d session, and other prior and subsequent reports with a view to determining what measures for flood control and channel improvement are advisable at this time on Walnut River and other tributaries in the southeastern section of the State of Kansas. The Water Supply Act of 1958 (title III, Public Law 85–500) provides authority to the Corps of Engineers to develop storage for municipal and industrial purposes.

Information on flood and water supply problems in the Walnut River watershed was obtained at a public hearing held by the district engineer at Winfield, Kans., on November 26, 1957, and at later informal meetings with local interests and from correspondence.

STATEMENT OF LEX LIVINGOOD, THE WILSON RESERVOIR ASSOCIATION

My name is Lex Livingood. I am a partner in a Chrysler-Plymouth agency and live at Lincoln, Kans. I am appearing as the official representative of the Wilson Reservoir Association. This association came into being through dire necessity. Constantly recurring floods in the Saline Valley in north central Kansas caused the association to be organized by the farmers and businessmen of the area for the express purpose of demonstrating public support for the Wilson Dam and Reservoir on the Saline River. I am no authority on the engineering problems in connection with water resources, and therefore shall confine my statements to those facts with which I am familiar as a resident in an area that is well known for its periodic floods and then intervening years of drought. I understand it is the announced policy of the committee at these field hearings to concentrate on testimony covering the most acute problems in the area. I shall, therefore, hold my remarks to this central Kansas region and point out only its more urgent water resource problems as they affect the national interest, as I see them.

The Saline River, upon which the Wilson project is to be located, has ravaged its valley again and again since the country was first settled. Ever since records have been kept, it has been shown that the Saline River is the source of costly and disastrous floods. In 1951, when almost the entire flood plain below the proposed dam was inundated, damages in the immediate area were estimated at close to $8 million. The peak flow of that flood exceeded 47,000 cubic feet per second, which when imposed upon the tremendous volume of floodwater in the Smoky Hill and Kansas Rivers, contributed to the $76 million in damages which occurred in areas below its junction with the Smoky Hill River. Also, under circumstances such as were present in 1951, the Saline River contributes to the flooding of large areas in Saline County and the city of Salina. Again in 1957 and 1958 floods occurred, and the losses were in excess of $2,500,000.

The proposed Wilson Dam is important in its own right, but it is now particularly significant as a part of the overall Kaw Valley flood control program. Other facts of national importance of this project merit your thorough consideration. Two of the several Atlas missile bases being built presently in the

United States are within the Kaw River Basin. These bases are of great military importance. The cities of Salina and Topeka, through which supplies and services for these bases will move, more than ever now require the flood protection benefits of the Wilson Reservoir.

Attention is further directed to the fact that the last two floods caused damages in excess of $10,500,000 and the floods in prior years have caused damage totaling many times the estimated cost of the dam. The Saline River, as its past records have so tragically proven, is an ever constant threat to the cities and areas in its flood plain. The completion of the Wilson Dam which will be started this year becomes now more important than ever because of its effect on the national defense installations.

At this point, I wish to place into the record excerpts from signed statements of fellow citizens, representing various organizations or governing bodies, regarding waste of this water and its great need in times of drought. D. B. Marshall, Jr., mayor of Lincoln, Kans., during the most recent flood: "Floods on the Saline River have caused extensive losses and the intervening years of drought forced many people in this area to transport water by truck for livestock and human consumption. We feel that a reservoir on the Saline River would, for the most part, prevent such floods and provide water during years of drought."

Board of County Commissioners of Lincoln County, Kans., October 1957: "Whereas the two recent floods of 1951 and 1957 have caused much damage, and the years between 1951 and 1957 being the worst drought on record; and whereas the water wasted and damage done by the flood during the drought years could have been averted by construction of the proposed Wilson Reservoir, with a subsequent saving of the entire cost of the original investment; and whereas these floods and periods of drought are of a constantly recurring nature, it is necesary that measures be taken to remedy the situation."

Lincoln County Farm Bureau, Ernest Kissick, president: "The years of drought forced many people to dispose of their livestock and created a water shortage for livestock, and, in many instances, drinking water."

To further indicate the great need of future water supply and for use in times of drought, Resolution No. 2132 was passed by the governing body of the city of Salina, Kans. on March 17, 1959, asking the U.S. Corps of Engineers to reserve storage and impounding area for 50,000 acre-feet of water in the Wilson Reservoir for the use of the city of Salina, Kans. It was stated that such action is necessary in view of the growth and expansion of population and industry. Other towns in the valley have also been greatly troubled with water shortages in these times of drought.

In addition to the necessity of stopping floods and the saving of our water supplies for the drought periods and the known greatly increased future consumption, there is also the essential need of protecting our vital topsoils from water erosion.

Lincoln County, Kans., in which I live and with which I am familiar, may be described as a typical Kansas county. A review of the conditions existing with reference to this Nation's greatest resource, its soil, and the effects of water erosion upon it, would also be typical of many counties in this section of Kansas.

I will briefly state what headway, or perhaps it would be more accurate to state "lack of headway," we have made in Lincoln County in the fight against water erosion of our productive soils:

The average annual rainfall is 24 inches. Considering the runoff characteristic of the county, it is estimated that with complete conservation treatment of the land, approximately 80 percent, or 19.2 inches of rainfall could be controlled and stored in the soil each year. This would amount to 701,414 acre-feet (326,000 gallons per acre-foot) stored in the land in Lincoln County.

Without conservation treatment, it is estimated that only 50 percent, or 407,743 acre-feet of water would be retained. In addition to the loss of water, there is the loss of valuable topsoil. This basic natural resource, through erosion, is being deposited in our county road ditches, State highway ditches, stream channels, rivers, reservoirs, and harbors.

The Lincoln County Soil Conservation District was organized in 1948. From that time until now, it has completed only 17 percent of the possible water conserving practices. At the present rate of application, it would take 78 more years, or the year 2037, before complete treatment could be effected.

How to accelerate this rate of application is one of our most basic problems. The rate of application must be speeded up if we are to conserve the remaining topsoil and retard runoff.

We have been particularly slow in building floodwater detention dams. Of 160 locations where flood control dams would be beneficial, we have completed only 13.

The possibility of getting more water conservation accomplished by group action should not be overlooked. In Lincoln County we are at present completing a pilot watershed project. Our experience indicates that it is more successful in getting the job accomplished than the sporadic haphazard efforts of each individual in carrying out the water conservation practices on his own particular farm, which has been a slow, piecemeal, and long-drawn-out affair.

The work on this pilot project, the Lost Creek watershed, has amply demonstrated to us living in that area that the results many times justify the effort and costs involved. It functioned very efficiently during several very bad flood years, with only two of the proposed three main units completed. It is being finished at the present time.

We must provide and keep favorable legislation, eliminating as much red-tape as possible, so that we can have more of the watershed development projects in carrying out the much needed water conservation practices. Time is running out. Already much of our topsoil has eroded. It can never be replaced. Let us by all the means we have at hand, save what is left.

Divine providence has greatly blessed us and given us the means to overcome our water problems. We have available the machines, the power, and the know-how to save, conserve, and distribute the water that falls on the earth. Let us make an overall approach and then lay out the timetable to accomplish so much of the work to be done for each year from now on.

JOINT STATEMENT OF EMMETT E. WILSON AND FRANK LIEBERT

The joint statement is filed by Emmett E. Wilson, appearing as mayor of the city of Independence, Kans., and as president of the Verdigris Valley Flood Control & Water Conservation Association, and Frank Liebert, of Coffeyville, Kans., vice president of the Water Resources Division of the Coffeyville Chamber of Commerce and as a member of the Tri-State Committee of the Arkansas River Basin Development Association.

The Verdigris River rises in the Flint Hills of Chase County and flows generally southeast to the southern boundary of Kansas in Montgomery County near Coffeyville. The watershed of this river includes the tributary Elk and Fall Rivers and other smaller streams. The river is one of the important streams of southeast Kansas. It is a tributary of the Arkansas River.

The history of this river in the past 50 years has been one of numerous floods and periods of drought. In the interests of brevity, it will not be necessary to enumerate the record which has been compiled by the U.S. Army Corps of Engineers.

To relieve the situation and as a part of the whole Arkansas River Basin multiple purpose development project authorized by the Congress, two dams have ben built; one on the Fall River near Fredonia, Kans., and the other on the upper Verdigris River near Toronto, Kans. A third dam has been authorized and plans drawn for its construction on the Elk River near Independence, Kans. A fourth dam near Neodesha, Kans., on the Verdigris has been authorized.

The construction of the projects planned by the Army Corps of Engineers as a part of the overall Arkansas River Basin development is necessary for the future area development of southeast Kansas.

Floods on the Verdigris have been very costly to both farm and city dwellers. Industry at Coffeyville, Independence, and Neodasha have been shut down and other new prospects discouraged from coming to this area due to floods and because of the extreme shortage of water at other times. Conservation of water is as important to this area as the prevention of floods in time of excess rainfall.

The solution of these two basic problems caused by erratic rainfall in southeast Kansas is the greatest problem for the people of southeast Kansas in the years ahead. It appears that our land is fertile enough to support a prosperous agriculture. Our cities are small and therefore can support a larger population, if our water problems were solved.

Soil conservation on the farms and other water conserving practices will help keep water and soil from being wasted. However, large reservoirs are needed to impound large quantities of water in order to provide water in times of drought for release to our cities for industrial, commercial and residential consumption. Any surplus can be utilized for irrigation of farmland. Large reservoirs

are needed to impound large quantities of water in time of excess rainfall in order to permit the orderly discharge of water down the Verdigris River without overflowing the riverbanks.

The impounded water within the reservoirs provide large inland lakes which give ideal recreational facilities for fishing, boating, and relaxation. It has always been one of the handicaps of the plains that there were no lakes or areas of water where families could enjoy water recreational sports and activities. Since there were no mountains and lakes, people left southeastern Kansas for vacations and more pleasant living environment elsewhere. Artificial lakes can make life more pleasant on the plains of Kansas. As an example, in 1958, 397,100 people went to the Fall River Dam site. In the years ahead, recreation for our people should be a very important consideration.

The basic benefits from the construction of large water reservoirs accrue to the State of Kansas and to the Nation as a whole, and therefore, must be constructed from finances obtained from the Congress. With modern transportation, and the operations of large businesses, people no longer tend to live in the area of their birth for the span of their life.

It is one of the problems for the future concern of the Nation as a whole to develop areas in which to move people from more crowded areas and overdeveloped industrial regions. Industry can no longer produce all the manufactured products for the country as a whole in one or two locations, so additional industrial locations must be found and developed. Southeast Kansas should be considered as a future area for additional industrial development and for the placement of additional population as our country grows.

The U.S. Army Engineers have set up a program for the development of the entire Arkansas River Basin within the next 12 to 15 years. We think the orderly construction of these authorized projects should be continued by the Congress. Among the projects yet to be built and one which perhaps is next in line for immediate funds for construction is the Elk City Reservoir near Independence, Kans. Therefore the attention of your committee is directed to the Elk City Reservoir as the next step toward the long range development of water resources for southeast Kansas.

We thank you very kindly.

RESOLUTION

A resolution declaring the aims and objectives of the city of Topeka, Kans., to be presented to and filed with the Select Committee on National Water Resources of the U.S. Senate at its public hearing for the State of Kansas to be held in Topeka, Kans., on Wednesday, November 18, 1959.

Whereas the city of Topeka, Kans., as a municipal corporation and by its many citizens vitally interested in the problem of water resources in the area of Topeka itself, the watershed of the Kaw River and its tributaries, the State of Kansas and the Nation as a whole has taken an active dynamic and vital part in the urging of water conservation and water control projects at both a local and national level; and

Whereas the city of Topeka, Kans., as a municipal corporation is actively engaged in the completion of the Topeka flood control project; and

Whereas the city of Topeka, Kans., is vitally interested in the furtherance of local protection projects, upstream protection, water reservoirs control supply of water and conservation of the national wealth from the standpoint of protection of both property and persons; and

Whereas the city of Topeka, Kans., advocates strongly the establishment of strong local protection in the Topeka, Kans., area itself and upriver on the Kaw and its tributaries in order to protect both the local projects and the area of Topeka, Kans., and all cities and properties and persons along the Kaw itself; and

Whereas the city of Topeka, Kans., firmly believes that such local and upstream protection projects will result in benefit to the area of the Kaw itself and its tributaries and the Missouri and Mississippi Rivers and the areas affected by those bodies of water; and

Whereas the city of Topeka, Kans., believes that the cost benefit ratio of such projects and protection is very strongly in favor of both local and upstream protection projects; and

Whereas the city of Topeka, Kans., believes that the problem of control and protection from floodwaters and controlled water supply is of vital importance to the Nation as a whole and the area affected and served by the Kaw River and its tributaries and particularly the city of Topeka, Kans., itself all of which is urgently needed: Now, therefore, be it

Resolved, That the board of commissioners of the city of Topeka does hereby urge the Select Committee on National Water Resources of the U.S. Senate to give favorable consideration to the proposed projects for the control of floodwater and constant supply of water on the Kaw River including the construction of reservoirs. retention dams, levies, channels, bridges, and channel improvements and assures the select committee of the continued cooperation and interest of the city of Topeka in all such protection projects.

Mayor E. J. CAMP, *City of Topeka, Kans.*

STATEMENT OF ROBERT R. IRWIN, NORTH TOPEKA DRAINAGE BOARD

In response to letter dated October 28, 1959, from Hon. Andrew F. Schoeppel, the North Topeka Drainage District and the Shunganunga Drainage District No. 1, both of Shawnee County, Kans., wish to make the following general statement for consideration by the U.S. Senate Select Committee on National Water Resources. It should be noted that both drainage districts were initially incorporated under what is commonly termed the 1905 act adopted by the Kansas Legislature, and each of the districts has struggled unceasingly with the whole problem of flood control within their respective districts from the date of their incorporation to the present day.

Both drainage districts wish to join in and concur with the statement submitted by the Kansas Water Resources Board effecting the whole problem of water in the State of Kansas.

Remedial measures for flood control have been undertaken by the Shunganunga Drainage District purely on a local basis and extension thereof is not economically feasible due to the restricted geographical area of the drainage district.

Prior to 1951, remedial flood control measures within the North Topeka Drainage District were done and performed purely on a local basis. Subsequently thereto, with the help of the Congress of the United States, the Soldier Creek diversion unit currently in the process of completion in the area, was realized.

It is significant that immediately upon the appropriation by Congress of necessary funds, for planning only, new horizons appeared to open up for the area. In this connection the attention of the committee is invited to the rapid growth of the north Topeka area subsequent to the disastrous flood of 1951. Such growth having had as its impetus appropriation by Congress of necessary funds in order that recommendations of the Corps of Engineers of the U.S. Army could be carried out for the complete diversion of Soldier Creek away from heavily congested areas of the district. Attention of the committee is invited to the fact that records in the office of the county assessor of Shawnee County, Kans., show that the assessed valuation of tangible property within the North Topeka Drainage District has increased from $9,038,466 in 1951 to $14,211,065 in 1959. It must be remembered that this increase in assessed valuation reflects not only replacement of homes and businesses which were totally destroyed in the 1951 flood, but also enormous growth in commercial and housing facilities which cannot help but contribute to the national economy. It should also be kept in mind that within this area the assessed valuation of tangible property is between but 26 percent and 27 percent of true market value.

Projects undertaken by the Shunganunga Drainage District, purely on a local basis, have involved construction of two detention dams in upstream areas of Shunganunga Creek and complete control of the Shunganunga is embodied in plans heretofore prepared by the Corps of Engineers which will provide complete protection for the entire area, both within and without the Shunganunga Drainage District. It is the considered opinion of the respective boards that the watershed treatment program is but a part, albeit an important part, of the whole problem of water and the proper control thereof, it being felt that control of floods and conservation of water can be accomplished most effectively through construction of facilities with sufficient reservoir capacity to provide for devastating floods and extended droughts, which reservoirs in conjunction with the watershed treatment program will most effectively protect and promote the general welfare of the entire State and Nation.

The respective boards further concur in and recommend the program for control of floods in the Topeka area as promulgated by the Corps of Engineers. It is submitted that the value of large dams on the Kansas River, in order to insure a constant water supply and through sufficient reservoir capacity, provide flood protection for the cities contiguous to the Kansas River, cannot be overestimated and that the watershed programs, which are a function of the Conservation Service are necessary and supplemental to the general overall protection program as developed by the Corps of Engineers for this area.

The problems faced by the North Topeka Drainage District and the Shunganunga Drainage District No. 1 are similar to other like drainage districts, municipalities and unincorporated areas faced with similar water problems, the magnitude and scope of which cannot be overestimated.

It is respectfully submitted to the committee that the proper development, control, and consideration of our water resources are most closely related to the national interest and such measures as may be undertaken in the watershed of the Kansas River as well as those taken in the watershed of the Ohio as well as the watershed of all the other rivers and streams throughout the length and breadth of the land cannot help but promote the national welfare.

It is further respectfully submitted to the committee that the proper control and conservation of our water resources are just as vital, if not more so, than any other similar natural resource within the United States. It is felt that this will become more readily apparent throughout the years ahead; and that proper solution and adoption of a long-range program at this time having as its ultimate aim the proper control and conservation of water makes mandatory immediate adoption by the Congress of the United States of all necessary legislation in order to insure that such measures will be carried through to fruition at the earliest possible date.

Respectfully submitted,

BOARD OF DIRECTORS,
NORTH TOPEKA DRAINAGE DISTRICT,
SHAWNEE COUNTY, KANS.,
By HARRY R. LOGAN,
Its Attorney.

BOARD OF DIRECTORS,
Shunganunga Draining District No. 1, Shawnee County, Kans.
By ROBERT R. IRWIN,
Its Attorney.

STATEMENT OF T. M. MURRELL, STATE REPRESENTATIVE, TOPEKA, KANS.

Flood control and the development of our water resources are so closely related that from an overall planning standpoint we must consider them together. The people of Kansas, in the past few years have become increasingly aware of the importance of water to our overall economy. After the record-breaking 1951 flood, it was apparent that to get adequate protection we would have to store more water. In addition, the beginnings of a real industrial expansion were felt throughout the Kansas Valley and other valley areas in Kansas. This development was quickly threatened as drouth struck in 4 years in a row.

The severe wet-dry cycle pointed up the necessity of water conservation and supply, as well as flood control. And so, we have urged that each project now under consideration be given adequate capacity against drouth and inadequate seasonal flows. The various government agencies have been fully cooperative in this objective.

Kansas must have diversification and expansion of employment to maintain a growth comparable with other regions. Industry likes the meteorological and sociological climate it finds in the Kansas Valley. But without an assured water supply the year-round, progressive industry will look elsewhere. Even our domestic supplies have felt the pinch, although the needs of individuals are relatively small compared to industrial demands. We must put into the new reservoirs the storage for periods of scarcity.

The Kansas River is the most important contributor to flood hazard in the lower Missouri and Mississippi River Valley, and it is necessary that there be orderly sequence in the authorization planning and construction of flood control works in the Kansas River Basin. In the basin local protection works are underway. Reservoir construction includes a number of projects already

finished and substantial progress is being made on a key dam, Tuttle Creek on the Big Blue River near Manhattan. Preliminary planning is going ahead on other important units which have already been authorized by Congress.

The need for continued activity along the flood-control front has by no means been lessened by the current emphasis on water as a national resource. The existing tried-and-tested flood control provision first set forth in the 1936 authorization have made possible the beginnings of a workable system for the benefit of the midwest area. It has already functioned in the national interest.

We understand that there has been introduced into the Senate, a bill No. S. 2060, which would provide important modification of flood works as we now know it. This bill would establish a costsharing policy to charge against local interests at least 30 percent of the cost of any flood-control project. Before such a bill is adopted, we think that very careful consideration should be given to the desirability of setting such a flat rate of participation by local people. It appears to be so inflexible that the economic position of the various areas considered, the magnitude of the flood problem and the national interest involved could not be properly considered by the planning agencies or by Congress itself.

The principle of local cooperation is recognized as good, and is practiced at present. However, this cooperation should be evaluated for each individual situation rather than an across-the-board allowance, inflexible in operation, and applied without regard to special conditions which any reasonable body would wish to look into. We believe that the history of benefits from most of the projects already completed will fully substantiate the economic worth of these projects even beyond that calculated by the planning agencies. In view of such experience, we feel that Congress should not restrict its opportunity to give full consideration to each project which may have engineering and economic support.

Kansas has created a progressive water resources board. This board has and is studying the water needs supply and costs. Its members have put Kansas on record as wanting water storage and control to go ahead before it is too late. The justification for adequate, multipurpose reservoirs is found to bear up well with that of reservoirs originally planned for flood control alone.

The Kansas Legislature has repeatedly wholeheartedly endorsed the program for flood control and water conservation planned by the various Government agencies and it has by resolutions urged and petitioned the Congress of the United States to continue surveys, planning, and construction of all those vital projects necessary to the prevention of floods and the conservation of soil and water.

The people of Kansas at the last general election also demonstrated their interest in flood control and water conservation by voting by an overwhelming majority in favor of an amendment to the State constitution which will permit the State to engage in works of internal improvement for flood control purposes.

An aggressive and prompt construction program is essential to the Kansas River Valley and it will pay its way, nationally. Experience in the 1950's has shown that we must control our water and to avoid a reoccurrence of this period we must have prompt and positive action. Rivers and water know no political boundaries.

STATEMENT OF BLACKWATER, LAMINE, FLOOD CONTROL AND CONSERVATION ASSOCIATION

NOVEMBER 12, 1959.

Gentlemen of Senate select committee, as president of Blackwater, Lamine, Flood Control and Conservation Association, I would like to file this prepared statement.

This association is located in the west-central part of the State of Missouri, south of the Missouri River. The basin is about 60 miles wide, 70 miles long, and has a total drainage area of 2,640 square miles, and a population of well over 100,000 persons, of whom less than 50 percent are concentrated in urban cities such as Sedalia, Marshall, Warrensburg, Higginsville, and Sweet Springs. The basin is principally devoted to agriculture. The average value of farm crops, livestock, manufacturing products ranges between $25 and $30 million annually.

The 1951 flood inundated 71,000 acres of land, of which 64,000 acres was cropland, and caused an estimated loss of $5½ million. The total flood plain area subject to possible flooding along main streams and tributaries is about 99,000 acres.

Gentlemen of Senate select committee, the Government engineers are at present surveying this basin for possible water storage and flood control, which would relieve this basin of the millions of dollars damage during floods, give them adequate water supply for irrigation, livestock, and recreation during dry cycles.

In long-range planning the cities of Sedalia, Warrensburg, Sweet Springs, see a water shortage in the not too distant future.

With proper water storage and flood control, the excess water in wet cycles could become a great water resource, to be used by all people in the basin, and also give the before-mentioned cities adequate water supply and furnish recreation areas for people of the Midwest.

With one of the Government's jet air bases located in this basin, you can readily see what such a water resource project would mean to this basin.

So, gentlemen of this committee, we of this basin hope in considering water resources policies for the future you will give this basin serious consideration.

I wish to thank this committee for the privilege and honor of allowing me to present this statement.

Respectively submitted,

STEVE JACKSON,
President of the Association.

STATEMENT OF MISSOURI-ARKANSAS BASINS FLOOD CONTROL AND CONSERVATION ASSOCIATION

We feel that your committee has been charged with one of the most challenging and profitable tasks an American citizen could accept today. We are glad to lend assistance by viewing your mission through relatively local eyes and reporting to you what we see. Actually, we are not strictly local as our members live in the several States which embrace the lower Missouri River and the Arkansas River Basin in Kansas. Our report on this area will attempt to answer (1) how and why the Nation as a whole has any interest in current water resources activities in our midwestern valleys, and (2) what further work in water will be necessary to keep this area growing and contributing to the welfare of the country at large during the next 20 years.

At the outset, the association wishes to commend the Congress for many progressive legislative steps toward a water resources policy for the Nation. Some have called our progress piecemeal, halting, and even "pork barrel." These terms we reject as springing from sources wholly uninformed of the overall and longtime efforts of many sincere men at both Federal and local levels. True, progress has not always been as rapid as we may have wished, but there have been many good reasons, such as war and economic variations. Nevertheless, since the days of the National Resources Board in the early 1930's we have come a long way and the Nation is far richer in water values today.

The biggest step since 1930 was the 1936 declaration that flood control is a national responsibility. If such control is legitimately a responsibility of the Nation, then the Nation may properly expect to have an interest in and a tangible profit from the work that is done. We intend to demonstrate that this reasonable expectation has been fulfilled in our portion of the Midwest. We also believe it is true in many other areas throughout our land—the Nation at large is profiting by water resource development at so-called local levels.

Although the 1936 act is cited as a significant step, we must hasten to recognize earlier provisions for reclamation and navigation. Very logically, Congress has expanded its concern in the fields of public health, power, fish and wildlife preservation and, more lately, recreation. All of these, to some degree, have been confronted by local people; limited usually by local fiscal capability and the availability of integrated planning. Now, by congressional action, many ways are open for a wider and far more profitable use of water for the good of all our people.

NATIONAL INTEREST IN MIDWEST WATER

Just what is being done in this area which honestly can be labeled in the national interest? Obviously, we must give local names to the individual structures, but in a sense many should be called the United States dam, or levee, or channel, or ditch, or reservoir. We cannot see a barge tow of grain move from Omaha to St. Louis without recognizing its relation to national and world trade. The stabilization of our "local" Missouri River banks has made it possible for controlled upstream releases to float 800,000 tons of freight this year. That is

national business, no matter where it originates. And who can say that 110-bushel-per-acre corn grown on Missouri bottomland is not a factor in our world plan of economic aid? Before Congress directed bank stabilization this land would have been cut away by a wild river. It took a national concern to protect 700 miles of river. Now the Nation is receiving its pay in a stable farming operation which pays large taxes.

The people of Kansas, Nebraska, Iowa and Missouri take local pride in levees that are being built along the Missouri River by authority of Congress. But actually these thousands of protected acres are supporting a high level of food and taxes which affect the entire Midwest economy. During the floods of 1943–44 and 1945, when we were at war, the Federal Government restored hundreds of local levees two or three times, because the products from these lands were war essentials. This same river, in the 1940's, was an avenue for military boats built inland for delivery to Normandy beachheads. Today, the cargoes are oil and grain and steel and molasses, but the origins and destinations are still not "local"; they read from Pittsburgh to New Orleans and beyond.

No report concerning national interest in the water problems of Kansas and Missouri could omit the 1951 flood. It cost this area approximately $1 billion. The losses reached into every State where Kansas City goods are bought or sold. A dozen railroads felt the shock of interrupted service throughout as many States. Even Uncle Sam is reported to have lost nearly one-half billion dollars in income taxes which were written off in the postflood years. At this point in our report (with particular reference to Topeka and Kansas City), we must recognize that a fine plan became stymied just in time to meet disaster in the Kaw Valley. Reservoirs which were to have worked in conjunction with local levees had not yet been built. We had the levees, but they weren't enough without the supplementary dams in the Kansas River Valley. The reservoirs, with the levees, would have cut the local and Federal losses to minor proportions if we had built them in time. Now we are starting the reservoirs. It's critical to us and the Nation's pocketbook that we finish them soon.

One very bright spot warrants comment in contrast to the many losses in 1951. Salina, Kans., is one of our biggest grain storage centers. It is located below the Kanopolis Reservoir which, fortunately, was completed in the late 1940's. This lone structure, even without the local levees known to be needed at Salina, saved the city from three separate floods in the summer of 1951. Although finally flooded by a downstream cloudburst beyond the reach of Kanopolis, Salina was spared millions of dollars damage and the Nation's food loss in this area was minimized. We are happy to add that Salina's levees are now underway, since Congress authorized them in 1954.

Topeka, our Kansas capital city, is also getting its authorized levees and is praying for fast action on the Kansas River reservoirs, including Tuttle Creek which was closed just recently. At Topeka, as in Kansas City, the 1951 losses charged to local and Federal accounts were tremendous. The solution to these two municipal problems lies in a decade of concentrated reservoir construction. Without such work on reservoirs, the 1951-type flood will overtop levees and history will repeat itself. We think that national interest in affairs along the Kansas River is self-evident.

Far less spectacular, but nonetheless of national interest, is the dry side of the water problem. Briefly, we often find the Kansas River at Topeka running so nearly dry in the late summer as to threaten the water supply of 100,000-plus people and also the large Forbes Air Base. Conservation storage now planned will solve this difficulty. We are sure that the Air Force is concerned on a national level. Similar conditions have existed many times in the Arkansas River Basin when a few years ago, the city of Coffeyville was purifying the water from its sewage disposal plant for city drinking water. Nor can we overlook the widespread effect of the reservoir lakes which attract visitors from nearly every State in the Union. For example, Kanopolis has 500,000 annually, Harlan County Reservoir on the Republican River in Nebraska averages about 300,000, and the Tuttle Creek project promises attraction for some million people inside a very few years. This, too, is national business. Similar pictures can be drawn in the Osage River Basin (a Missouri tributary of the Missouri River) where the Pomme de Terre Dam is well underway. The recreational pull of the large conservation pool in a small-mountain setting will make this Ozark Reservoir a many-State attraction. We support the bill introduced by Senator Kerr and shall continue support of similar legislation which would allow credit to be given to the recreational benefits of reservoirs determining their cost-benefit ratio. The flood storage of Pomme de Terre, acting together

with such authorized dams as Kasinger Bluff, Stockton, and Hackleman Corners, will hold down the critical flood crests on the lower Missouri and even some on the Mississippi River.

One might well title the next phrase of our comments, "Where do we go from here?" What and how much do we need in this area of the Midwest to insure protection and growth which will match the rest of the country? The simplest answer (and not too inaccurate) would be, "Finish with dispatch the projects which Congress has already authorized." With an entire country in desperate need of water-related structures, we know it is not realistic to hope for financial miracles. And yet we cannot fulfill our moral obligations to the communities we represent if we fail to point out the things we need. Actually, they are the things which the Nation needs, too.

Close examination of the items we have started discloses that they were often the first steps toward a larger development demanded by the inevitable economic growth. There are other projects not yet started but which are on their way to Congress, even now. These are projects requested by the people, studied by appropriate planning units and recommended to the Federal Government for serious consideration. If there seems to be a sizable backlog of such proposed projects, it may well be due in part to the fact that work in the upper reaches of our river valley had to be given first priority.

We were well aware of the basic need for main-stem reservoirs on the Missouri River. They laid the groundwork for development of the feasible irrigation and power. With these phases of water use, we are not critically concerned on a local basis, but we recognize full well the economic impetus which they bring to our sister States. The resultant progress north of us helps build a market for our goods. The net result is mutually good. With the other products of main-stem control, we are intimately and vitally concerned. We need the guaranteed-minimum flow of water for navigation and we want the assurance of flood reductions to make our Missouri River levees function safely.

Now that many of the upper river problems are nearing solution, we urge that all available funds be directed to finish our going jobs and to begin the supplementary work which we all can see ahead of us. Our going jobs are largely along the Kansas River proper, and in the Osage-Marais des Cygnes Valley. It goes without saying that we must quickly finish Tuttle Creek (the key Kansas River reservoir) and Wilson now under construction as well as Pomona and Pomme de Terre now under construction in the Marais des Cygnes-Osage Basin. This will take some 3 or 4 years. During the next 4 years we must clean up the city work, consisting largely of levees and walls.

But we dare not sit complacently by and wait for 4 years to start another reservoir. If we do, we risk the same catastrophe we discussed in connection with the 1951 flood. We will have the foundations laid for protection of Ottawa, Kansas City, Topeka, and Manhattan, but no superstructure, so to speak. That means, we must start as soon as possible to build the other reservoirs upon which these cities and the intervening farmlands depend. We are all informed of the Government's integrated levee and reservoir plan. We must speak and act now for the remainder of the works.

Perhaps, for the record, we should spell out those projects which must close ranks behind our existing reservoirs, levees, and bank stabilization. To have any semblance of the minimum protection we've planned, we must finish all the municipal levees and build reservoirs at Milford, Perry, Malvern, John Redmond, Council Grove, Elk City, Cedar Point, and Marion. Without these, we are gambling on the possible loss of a large portion of our present system. Without these, there cannot be a guaranteed-minimum flow at critical points in Kansas. All of these reservoirs should be completed before the end of 1969—preferably, much sooner. Along the Missouri River we are faced with a similar urgency "to complete or lose." The bank work must go on to firm, tie-in points or be eroded away at unstabilized vulnerable spots. To prevent any further retrogression in this program, we must complete the channel works in the next 3 to 5 years. Without such work our navigation will dry up and the system of major agricultural levees we've started will stop short. These two fine projects along the Missouri River in northeast Kansas and northwest Missouri must go ahead if we are to "cash in" on the national and local profits which are due on this long-range investment.

It may seem trite to point out the need for completion of going projects, but the emphasis is not that we shoul dcomplete, but that we must expedite the completion. We must clear the way for the "longer look" at this area and its water needs. There appears to be no immediate plateau on which we may rest awhile or where we may reasonably say that national interest and cooperation

have played their role and are no longer necessary or desirable. In general, our association foresees the next major needs of this area as—

(*a*) Development of the Grand River Basin program.

(*b*) Expansion of the Osage River reservoir system to achieve the full plan.

(*c*) Rounding out the maximum potential storage capabilities of the Kansas River Basin and authorizing recommended projects.

(*d*) Adjusting low flows to obtain the maximum feasible for industrial and domestic needs.

(*e*) Setting up a workable level of maintenance to keep the lower Missouri River stable.

(*f*) Extending the authorized agricultural levee system downstream wherever the units are found to be economically sound.

(*g*) Achieving the most from recreation possibilities at reservoirs and along the major streams.

(*h*) Picking up the isolated areas of need which occasionally develop in a changing economy and population pattern.

These may not necessarily represent the priorities which the future will dictate, but the list indicates that we have a long way to go in 20 years. It further indicates that the cost will be sizable and that careful synchronization will be required to optimize the program results. The goals are high, but they represent a continuation of the national interest in our area. The objective of this plan for 1959–80 is to achieve a protected farm economy along 500 miles of the Missouri River; to bring safety from floods to several million citizens in the Kansas, Marais des Cygnes-Osage, Arkansas, Grand, and Chariton Valleys; to expand the navigation potential of our major river; to hold our present water-using industries and to attract more; and to bring the assurance of worthwhile, water-centered recreation in communities not so endowed by nature. Along with these specific and tangible results, we will inevitably profit by improving sanitary conditions and offering at least some degree of irrigation potential.

Continued and intensive planning by the local and Federal interests will be necessary during the two decades. That is not to say that the program which we have already outlined is a hit-or-miss affair. There has been much thought given to the future—what is needed, what it will cost, and how we can coordinate the efforts of all who are involved in the problems. For example, the development of the Grand River by a series of reservoirs is not simply to reduce the severity of floods in the Grand Basin. Such a single objective would be commendable, but we feel it would be short sighted and perhaps not worth the price of the required reservoirs. Such a limited approach is not envisioned.

We have studied the preliminary plans and we support the Grand River project because of its effect on the Missouri. It is the only major source of supply and control between the Kansas River and the Osage River. We must have its extra water when needed, if we are to keep pace with navigation needs in the lower river. We must also be assured that the Grand can be "shut off" when its very frequent floods threaten the capability of downstream levees. For these reasons, we view the Grand River not as an isolated trouble maker, but as a profitable multi-purpose tool which we must use in the coming years. The completion of the Osage system is desired for reasons closely paralleling those noted for the Grand. The safety and development of the lower Missouri are directly tied to work in these two tributary basins.

The Kansas basin has been in the "public eye" for many years. It has fully demonstrated that it can wreck a whole region or dry up to the point of starving out its citizens. The work already built or underway is just about what we need to hold our own. The future must be concerned with pushing our capabilities to a point where we can progress and make our reasonable contribution to the total population. We need the extra storage on smaller tributaries to meet the bigger floods which can come. We need the dry-year storage to effectively clear up the main stem and to encourage manufacturing. It is evident that a strictly farm-centered State can no longer keep pace. Industry will come and stay and pay taxes if we can keep it safe from flood and deliver plenty of water. This we propose to do, and the Federal, State, and local authorities will have our fullest cooperation.

With the skimpy amount of summer water supply available in many of our streams, we cannot now encourage supplemental irrigation, even though it is often profitable. Water recreation is becoming not a luxury, but a demand by

millions who have time and money to spend if only there is a reasonable place to go. All of our basic water proposals lend themselves to satisfying these needs without great additional expense. We plan to push for these side benefits because we feel they reflect a justifiable desire on the part of our taxpayers. It is fully recognized that regional activities in all these fields have their repercussions on the more local efforts by individuals and lesser elements of Government. We are already experiencing an upsurge of farm diversification as flood protection appears as a reality. Sprinkler irrigation, even in our humid zones, is and will be practiced profitably where water is available in the late growing season. Farm ponds are springing up as our people observe the demonstrated value of the larger impoundments brought about through federally planned construction. These practices are supported and encouraged by our association.

OUR PRESENT PROGRAM NEEDS CONTINUED SUPPORT

It is the opinion of our organization that the Congress has started on a sound policy of water resource development. We have had firsthand contact with the various governmental agencies which carry out the directives of Congress. The planning seems to be in accord with the wishes of the people, although we are anxious to move forward at a faster pace, if feasible. New legislation is carefully studies by our group and, in general, we find it helpful. We reserve the right to suggest modification where an overall application seems to miss the mark locally. We know that progressive acts at the Washington level sometimes call for additional laws at State level to keep things moving. We are prepared to cooperate toward expediting such local legislation. Our States have been receptive to such assistance and we all believe that democratic processes are being served by the present method. We feel that the majority of our objectives have national significance and will result in profit to the country's economy and welfare. The committee and its sponsors are to be commended for the forward look to insure progress at an economical rate. We shall be glad to furnish such other data as may be helpful to this scrutiny of national water resources.

Respectfully submitted.

WILLIAM G. CALVERT, *President.*

Attached hereto for information of committee is a copy of the constitution, bylaws, and resolutions adopted at the annual meeting of Mo-Ark in Kansas City, Kans., September 11, 1959.[1]

RESOLUTION

Whereas a U.S. Senate committee is now holding hearings throughout the United States and will hold one at Topeka, Kans., on November 18 to hear interested parties regarding the water resources of the United States and their conservation; and

Whereas the Board of Public Works of the City of Sedalia, Mo., is charged with supplying potable water to the city of Sedalia; and

Whereas it is the grave concern of the board of public works as to the best means of supplying the additional water necessary to meet the demands of a growing population and an enlarged industrial development of the city of Sedalia and vicinity: Now, therefore, be it

Resolved, That the following statement in regard to potable water resources of Sedalia and central Missouri be respectfully submitted to this committee for their information and consideration:

"STATEMENT OF AVAILABLE WATER SUPPLY

"Sedalia is situated on a high prairie between the watershed of the Blackwater and Lamine Rivers, approximately 90 miles east of Kansas City, Mo. The present source of supply consists of a reservoir 12 miles south of the city, which supplies approximately 95 percent of the water used, except in dry years

[1] Placed in committee files for reference.

when it is necessary to use as much water as is available from a limited well field.

"This reservoir formerly had an overflow capacity of approximately 1,800 acre-feet, but after 30 years of silting, the capacity has been reduced to something less than 1,400 acre-feet.

"The well water available is from two horizons: One approximately 800 feet deep and the other one 1,500 feet deep. The water quality from both formations is highly mineralized and should have the total solids content reduced for industrial and commercial use. The specific yield of both horizons is less than 3 gallons per minute per foot of drawdown. This means that the well water is very costly to obtain and the maintenance on the wells runs quite high.

"The above condition of potable water supply is equally applicable to a great portion of west central Missouri. Cities located on rivers large enough to supply their needs or cities located upon or near impounded reservoirs are indeed fortunate in having a never-failing supply of water."

Be it further

Resolved, That the board of public works resolution dated May 1, with its accompanying report, be attached to and made a part of this resolution; and be it further

Resolved, That the board of public works requests the committee to consider means whereby cities, States, and regions may develop water conservation programs in which all might participate in the cost, but in such a way that it will not be an excessive financial burden on any segment of the population and that the necessary legislation be enacted at an early date so no region may be adversely affected by water shortages for various purposes as we approach the decades ahead in which the population of the United States will explode to unprecedented numbers.

Passed and entered in minutes of meeting of the board of public works, Sedalia, Mo., held November 16, 1959.

HERMAN E. BLOESS, *President.*
W. A. HOWELL, *Secretary.*
C. R. BOTHWELL, *Member.*
CLAUDE BOUL, *Member.*

RESOLUTION

Whereas the city of Sedalia is increasing in population and in the use of municipal potable water; and

Whereas Maj. C. Hagar, general manager of the Sedalia Water Department has completed a report showing the water reservoir capacity that will be needed by or before the year 2000; and

Whereas the board of public works feels that it will be most economical and in the best interests of the city to participate in a joint program of water conservation with the Corps of Engineers, U.S. Army, as outlined to the board by Mr. Hagar: Now, therefore, be it

Resolved, That the board of public works requests that the Corps of Engineers reserve approximately 8,000 acre-feet of water storage in one or more reservoirs in the vicinity of Sedalia for which the board agrees to sign a contract and pay a reasonable price as outlined in Public Law 85–500 (title III: Water Supply), 85th Congress. Such contracts to be reviewed and mutually agreed upon at the time detailed plans are presented.

Unanimously adopted at special meeting held at water department office, 8:30 a.m., May 1, 1959.

CERTIFICATE OF SECRETARY

I, the undersigned, W. A. Howell, certify that I am the Secretary of the Board of Public Works of the City of Sedalia, Mo., and that the above and foregoing is a true and exact copy of the resolution adopted at the aforesaid meeting, and that no part thereof has been rescinded or modified.

In witness whereof, I have hereunto set my hand and affixed the seal of said board of public works, this 5th day of May 1959.

W. A. HOWELL, *Secretary.*

A REPORT TO THE BOARD OF PUBLIC WORKS ON THE REQUIREMENT OF POTABLE WATER FOR THE CITY OF SEDALIA, MO., PROJECTED TO THE YEAR 2000

Maj. C. Hagar, P. E., General Manager, Sedalia Water Department; Research By J. L. Blackwell, April 1959

GENERAL

This report covers a period of potable water needs for the city of Sedalia, from the present time to the year 2000. The estimates given are based on past history of water consumption and are projected on a reasonable basis of population growth and increase in present per capita per day water consumption.

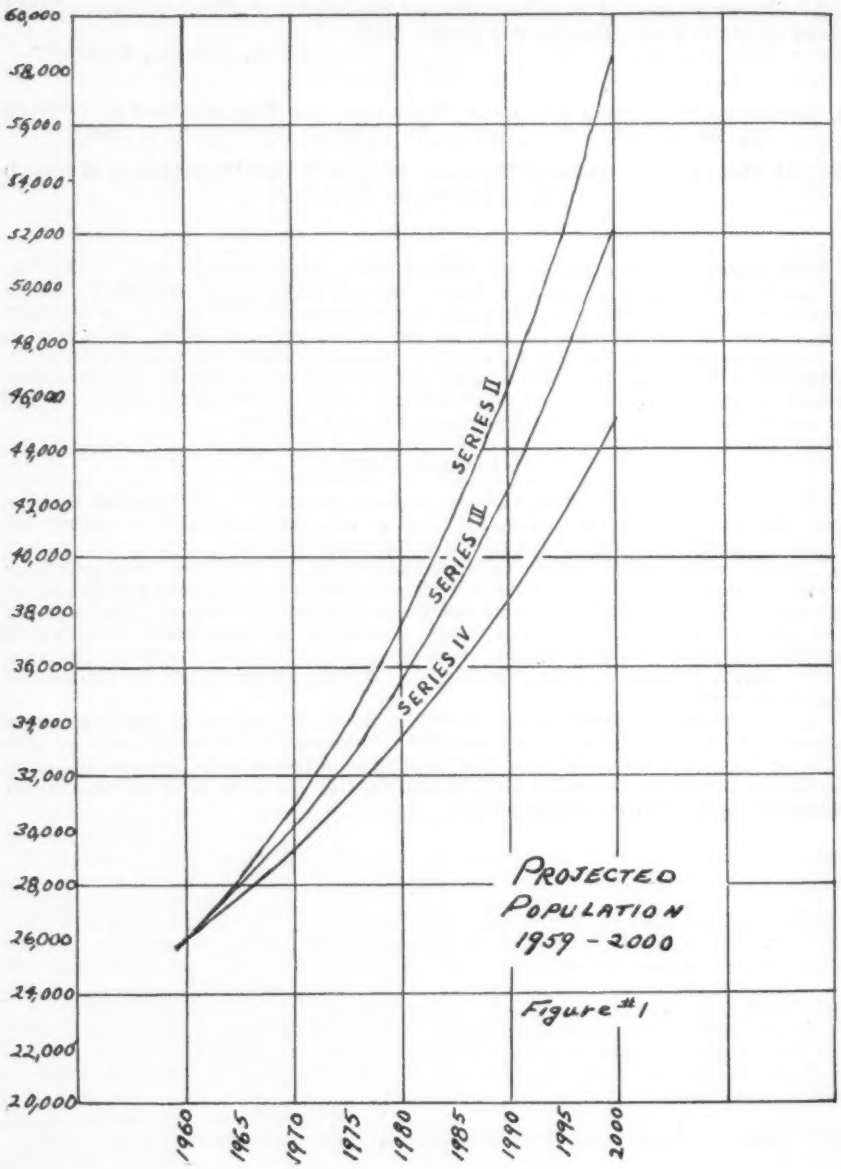
Estimates herein given are the result of analyses of Federal agencies on population growth and water consumption and on analyses made by the American Water Works Association. All analyses have been developed from past records of water consumption by municipalities in the United States.

POPULATION GROWTH

The U.S. Department of Commerce, Bureau of the Census' "Current Population Reports, Population Estimates" dated November 10, 1958, projects the population growth of the United States to the year 1975.

Using this estimate, a graph of three curves (fig 1) has been developed from fertility tables and does not take into consideration any increased longevity or mortality of the population. It is noted that the series 2 curve is the steepest and shows a population of over 58,000 people by the year 2000. Series 3 is based on a lower fertility rate and shows a population of 52,300 by the year 2000. Series 4 which does not increase so rapidly shows 45,000 by the end of the same period.

Many students of mankind have written much in regard to the "exploding population" within the next few decades. However, to be as realistic as possible, it has been assumed that the Sedalia population will increase approximately as shown in the series 4 curve and that by the year 2000 the population should be approximately 45,000 people.



WATER USAGE

Figure 2 shows a total annual pumpage of water by the Sedalia Water Co., and later by the Sedalia Water Department from the years 1934 through 1958. It is noted that the year 1953 was high with 750 million gallons used; 1953, of course, was an extremely dry, hot year which accounted for the extra water consumption. Figure 3 shows the high month for the same period. It is interesting to note that while 1953 had the highest yearly consumption, that 1957 had the highest peak month consumption. This, I am sure, reflects the increased use of water-cooled air-conditioning equipment. The peak day consumption is shown on figure 4 for a similar period and again the peak day occurred in 1957, following very closely the consumption shown on figure 3 for the peak month.

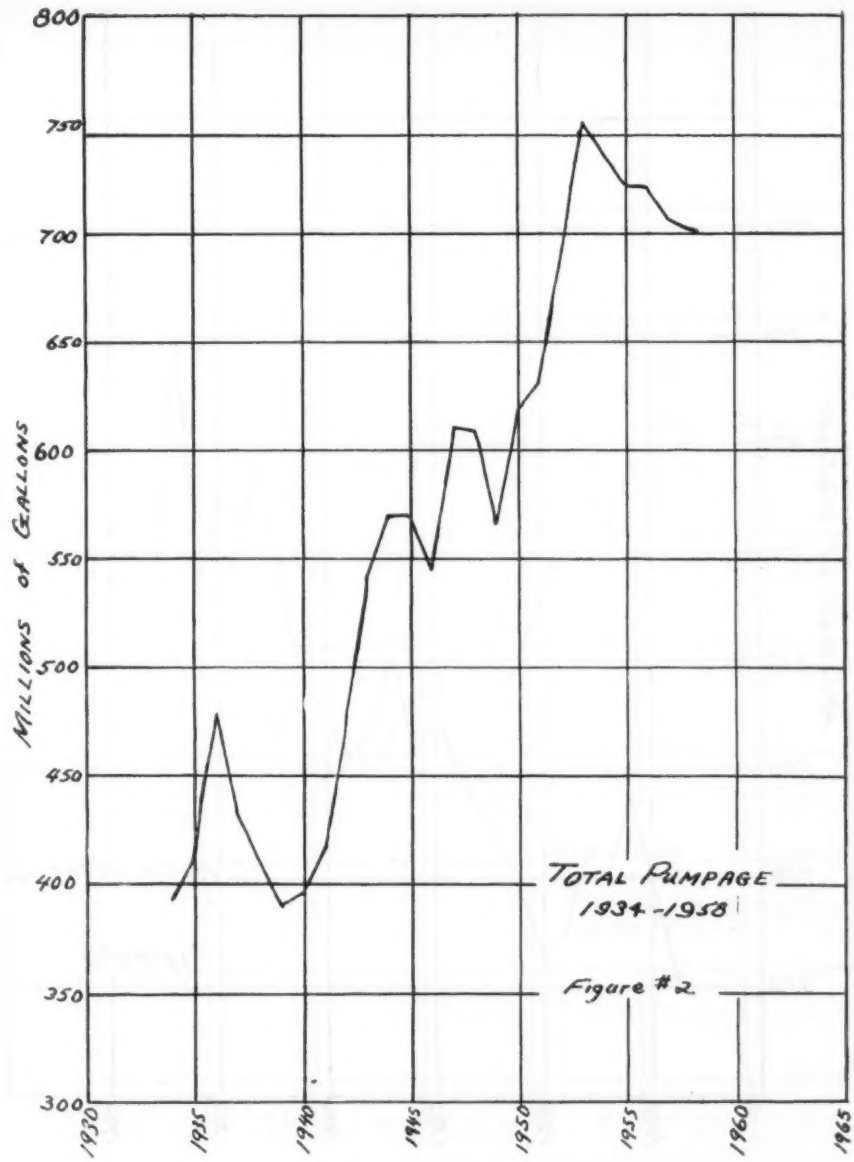


Figure 5 shows both the per capita per day consumption of water from 1934 to the present, and the national average per capita per day consumption for municipal water as compiled by the American Water Works Association. The national per capita per day average has been projected to the year 2000.

To evaluate the total consumption of water in the year 2000 as extended in the foregoing figures, it is only necessary to multiply the population by the national per capita per day consumption and that by 365 days in the year. If this is done, it is found that the city will use 8.1 million gallons per day or 2,956,500,000 gallons per year.

No one knows whether the national average per capita per day will prevail in Sedalia or whether Sedalia will use somewhat less than the national average. However, it is interesting to note that the past history of per capita per day

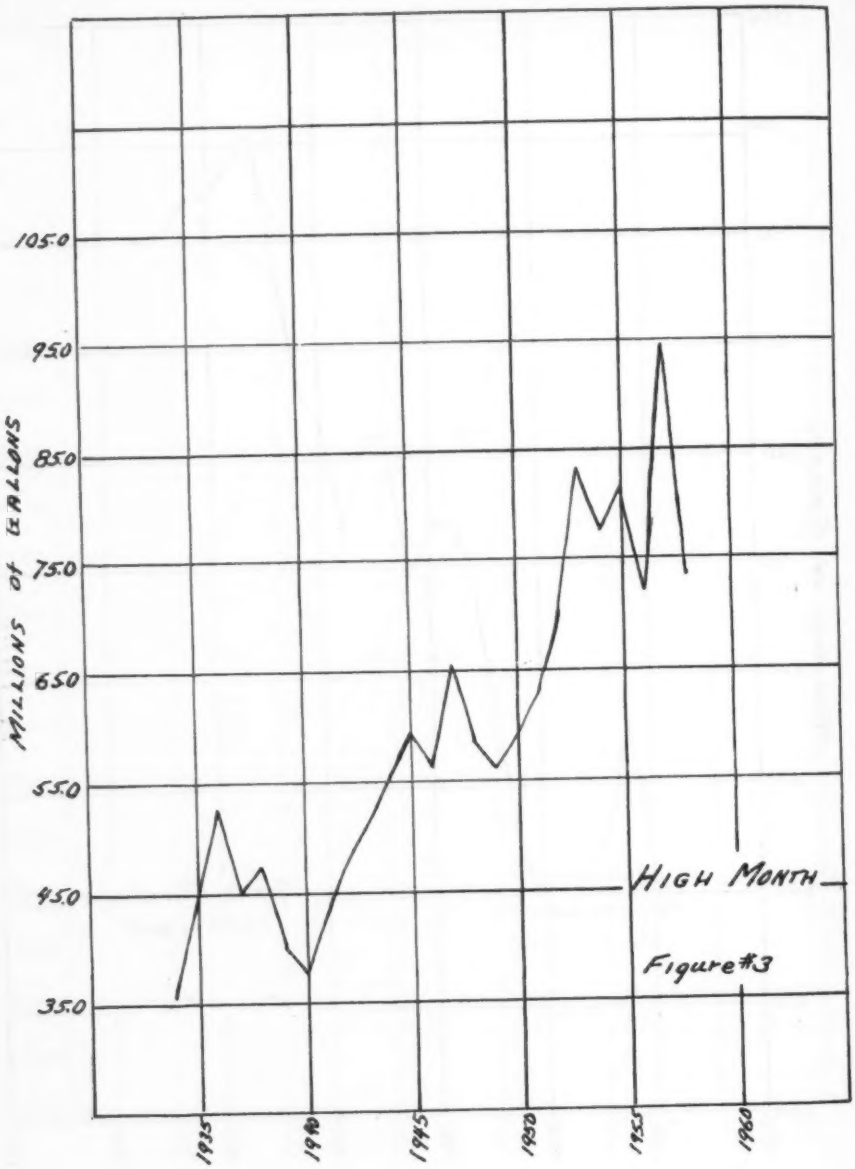

105.0
95.0
85.0
75.0
65.0
55.0
45.0
35.0
MILLIONS OF GALLONS
1935
1940
1945
1950
1955
1960
HIGH MONTH

Figure #3

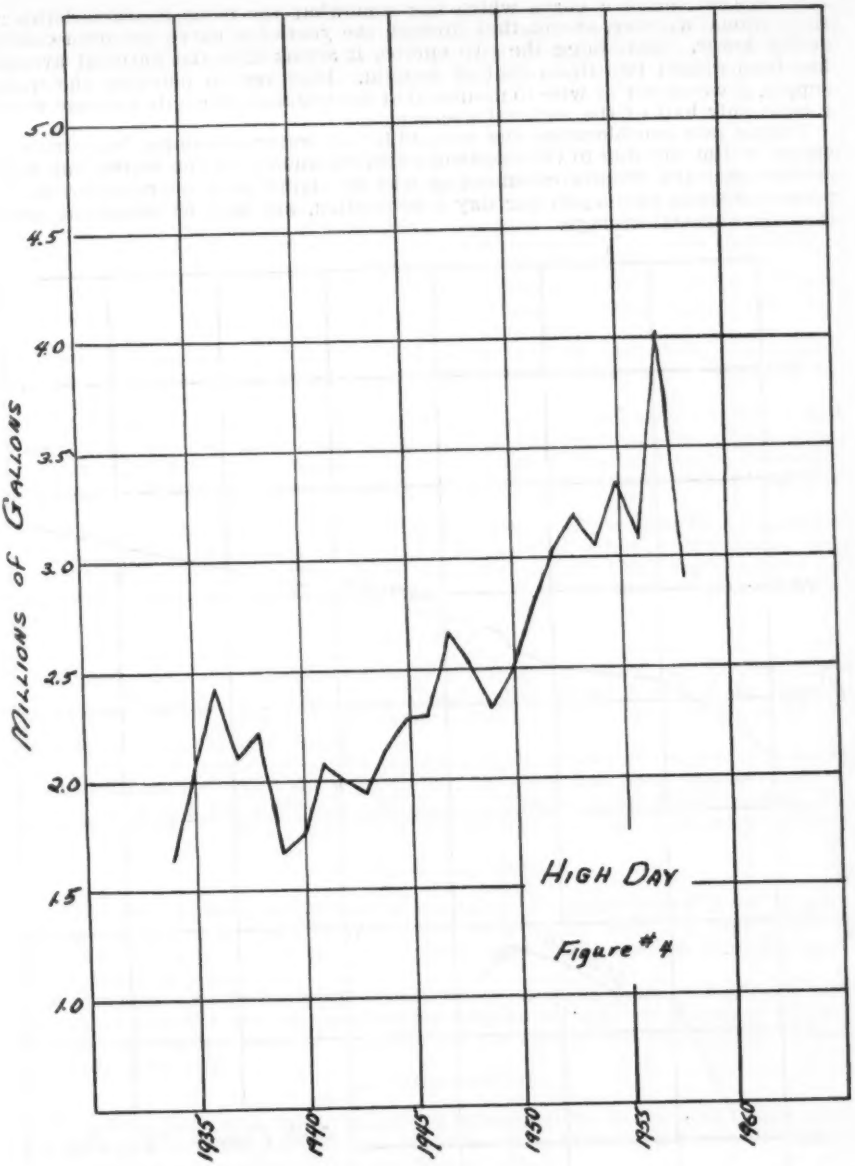

MILLIONS OF GALLONS
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
1935
1940
1945
1950
1955
1960
HIGH DAY

Figure #4

consumption shows a curve which has somewhat the same characteristics as the national average, except that through the years the curve has been considerably lower. Examining the two curves, it seems that the national average has been almost two times that of Sedalia. However, in planning the water supply, it would not be wise to assume that the Sedalia per capita average would remain only half of the national average.

Taking into consideration the probability of water-consuming industries locating in the city due to the excellent chemical quality of the water, one must assume that the Sedalia consumption will be higher than a projection of the present Sedalia per capita per day consumption, but may be somewhat lower than the national average.

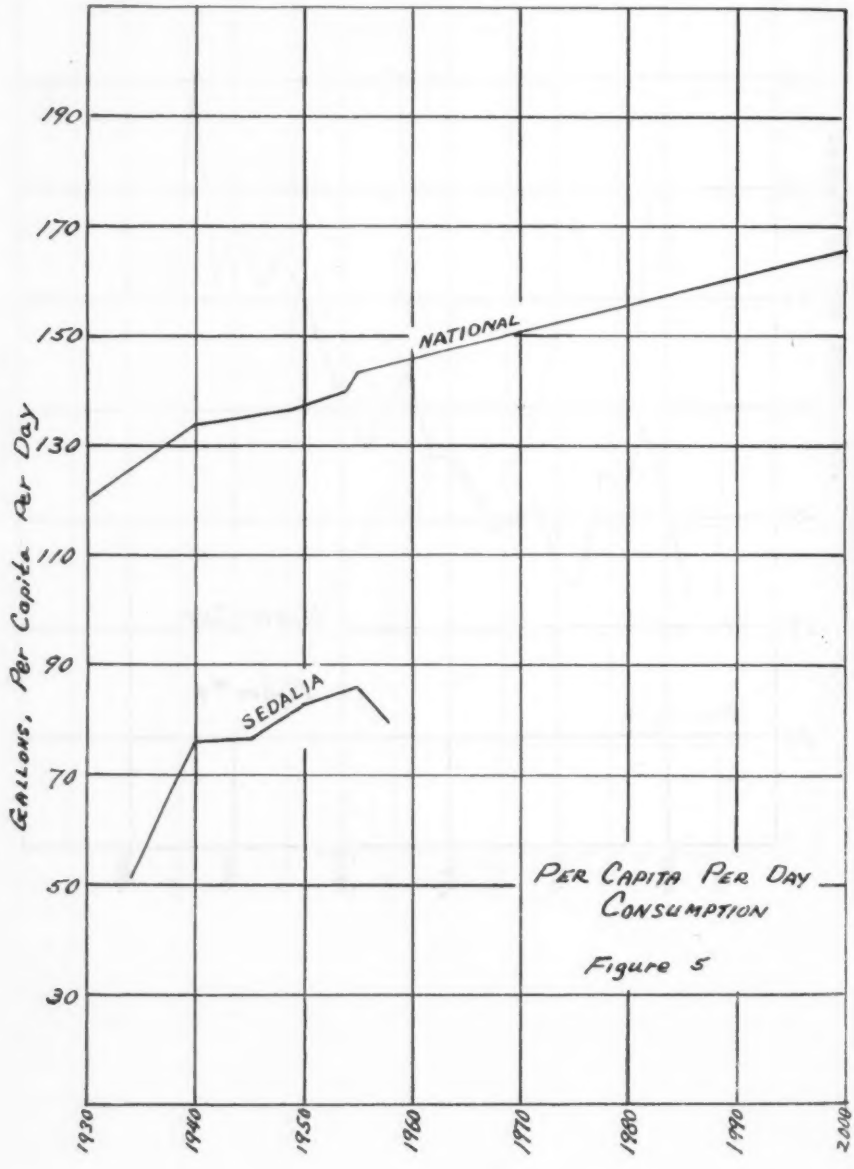


Figure 5

To leave a margin of safety in planning water supply but still being realistic as to the needs of the city, the writer feels that an average daily consumption of approximately 7 million gallons or 2,500 million gallons per year would approximate the needs of the city of Sedalia by the year 2000.

WATER SOURCES

At the present time the main source of water supply for the city of Sedalia is from the Spring Fork Reservoir located approximately 12 miles south of the city. This reservoir was built in 1926 and its capacity was approximately 1,720 acre-feet of water. At the present time, the capacity of the reservoir is estimated at 1,420 acre-feet. This indicates an approximate 17 percent in reduction of capacity due to the silting of the reservoir in the 32 years of operation.

Supplementing this reservoir, the city has three deep wells and two shallow wells which can be pumped simultaneously. These wells will yield a total firm capacity of approximately 1.75 million gallons per day.

As a third supply, Flat Creek which flows by the treatment plant can be used. However, in times of extended drought, this supply when most needed is not available.

The deep wells are approximately 1,500 feet in depth and have a rather highly mineralized water. This water while clear is considered to be a hard water and is not desirable for domestic or industrial use without extensive treatment. The present treatment plant is not designed nor equipped to soften this well water.

The water from Spring Fork Reservoir is practically all surface rainwater, with very little underground spring water discharging onto the watershed. Last year this water ran approximately 80 parts per million total hardness and 100 parts per million total solids. Such a water is excellent for both process water and home use.

RAINFALL

Figure 6 shows the precipitation in inches from the years 1871 to 1958. This represents statistics furnished by the Weather Bureau for zone 3 of the Missouri River Basin which extends from Omaha, Nebr., to the mouth of the river and takes in the area around Sedalia.

The average rainfall during this period is 34.38 inches; 48 years of this period had greater rainfall than the average, and 40 years had less. The greatest deficiency in recent years was in 1953 and 1956, when only approximately 23½ inches of rain fell. This low rainfall was exceeded in 1934 when only 23 inches fell.

FUTURE WATER SUPPLY

As the ground water in the area is limited as to quantity and is not of desirable quality, it should not be considered as a future adequate supply for the city. Therefore, it is felt that a surface suply is the best to meet the needs in the years to come.

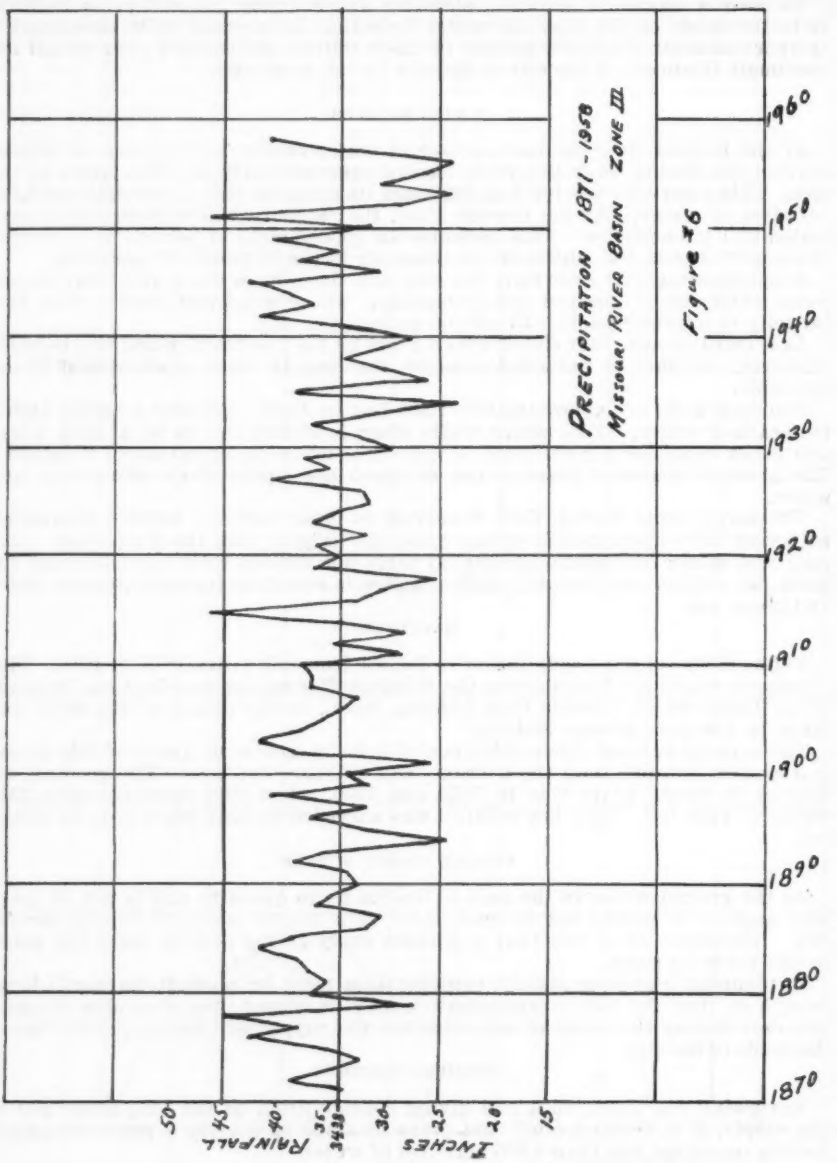
In planning a surface supply, consideration must be given to having it large enough so that the cost of amortization may be spread over a number of years and that during the years of amortization the supply will be adequate to serve the needs of the city.

RECOMMENDATIONS

Reviewing the above data and giving consideration to the long-range use of the supply, it is recommended that plans be made to develop a reservoir supply for city use of not less than 8,000 acre-feet of water.

It is further recommended that the city of Sedalia participate in the Corps of Engineers, U.S. Army, flood control survey and planning for the development of adequate flood protection and water conservation in the Lamine-Blackwater Rivers watershed, and that the board of public works request that reservoir capacity in the area adjacent to the city be set aside for municipal water supply.

The city of Sedalia's participation in such a program is based on Public Law No. 85–500, 85th Congress (title III, Water Supply). A copy of this section of the law is attached to this report.



PUBLIC LAW NO. 85-500—85TH CONGRESS

TITLE III—WATER SUPPLY

SEC. 301. (a) It is hereby declared to be the policy of the Congress to recognize the primary responsibilities of the States and local interests in developing water supplies for domestic, municipal, industrial, and other purposes and that the Federal Government should participate and cooperate with States and local interests in developing such water supplies in connection with the construction, maintenance, and operation of Federal navigation, flood control, irrigation, or multiple purpose projects.

(b) In carrying out the policy set forth in this section, it is hereby provided that storage may be included in any reservoir project surveyed, planned, constructed or to be planned, surveyed and/or constructed by the Corps of Engi-

neers or the Bureau of Reclamation to impound water for present or anticipated future demand or need for municipal or industrial water, and the reasonable value thereof may be taken into account in estimating the economic value of the entire project: *Provided*, That before construction or modification of any project including water supply provisions is initiated, State or local interests shall agree to pay for the cost of such provisions on the basis that all authorized purposes served by the project shall share equitably in the benefits of multiple purpose construction as determined by the Secretary of the Army or the Secretary of the Interior as the case may be: *Provided further*, That not to exceed 30 per centum of the total estimated cost of any project may be allocated to anticipated future demands where States or local interests give reasonable assurances that they will contract for the use of storage for anticipated future demands within a period of time which will permit paying out the costs allocated to water supply within the life of the project: *And provided further*, That the entire amount of the construction costs, including interest during construction, allocated to water supply shall be repaid within the life of the project but in no event to exceed fifty years after the project is first used for the storage of water for water supply purposes, except that (1) no payment need be made with respect to storage for future water supply until such supply is first used, and (2) no interest shall be charged on such cost until such supply is first used, but in no case shall the interest-free period exceed ten years. The interest rate used for purposes of computing interest during construction and interest on the unpaid balance shall be determined by the Secretary of the Treasury, as of the beginning of the fiscal year in which construction is initiated, on the basis of the computed average interest rate payable by the Treasury upon its outstanding marketable public obligations, which are neither due nor callable for redemption for fifteen years from date of issue. The provisions of this subsection insofar as they relate to the Bureau of Reclamation and the Secretary of the Interior shall be alternative to and not a substitute for the provisions of the Reclamation Projects Act of 1939 (53 Stat. 1187) relating to the same subject.

(c) The provisions of this section shall not be construed to modify the provisions of section 1 and section 8 of the Flood Control Act of 1944 (58 Stat. 887), as amended and extended, or the provisions of section 8 of the Reclamation Act of 1902 (32 Stat. 390).

(d) Modifications of a reservoir project heretofore authorized, surveyed, planned, or constructed to include storage as provided in subsection (b), which would seriously affect the purposes for which the project was authorized, surveyed, planned, or constructed, or which would involve major structural or operational changes shall be made only upon the approval of Congress as now provided by law.

SEC. 302. Title III of this Act may be cited as the "Water Supply Act of 1958".

Approved July 3, 1958.

STATEMENT OF TRUMAN SCHLUP, TOPEKA, KANS., KAW VALLEY DRAINAGE DISTRICT

Mr. SCHLUP. I have one from the chamber of commerce as to water pollution, and one from the drainage district.

Senator SCHOEPPEL. It will be received and made a part of the record.

(The statements referred to follow:)

STATEMENT OF THE KANSAS CITY, KANS., CHAMBER OF COMMERCE

The citizens of Kansas City, Kans., are well aware of the importance and effect of water on human life. In 1951 our community sustained an estimated $350 million in flood damage. Then starting with 1953 the community felt the effect of low-water levels for 4 years. The policy and efforts of the water committee of the chamber of commerce concerns both these conditions with all their ramifications. However, our statement today will cover only pollution abatement.

Both Kansas City, Mo., and Kansas City, Kans., have been given a mandate by the U.S. Office of the Surgeon General to begin showing progress toward ceasing to dump raw, untreated sewage into the Kaw and Missouri Rivers. Kansas

City, Kans., has set a deadline of 1962 for the building of facilities to give primary treatment to raw sewage and for the construction of necessary sewer lines. The cost for this work has been estimated to be in the neighborhood of $30 million.

Our water committee drafted a bill which it helped guide through the Kansas Legislature a year ago which permits a sewer-service charge to be collected from water users. Community leaders are now studying the problem of the needed facilities. To this problem we add the complications of joining with Johnson County in a 5-unit system for the entire Turkey Creek drainage area. Our community and its domestic and business citizens are willing to spend the time and money necessary to comply with the Federal Government's orders and to give a better supply of water to the people down stream.

Our chamber of commerce urges Congress to adopt a sound water policy, designating local interests paramount, and limiting Federal action to national needs.

STATEMENT OF THE KAW VALLEY DRAINAGE BOARD

The U.S. Senate is to be complimented for its forward look into the Nation's most important natural resource preservation and this special committee has our sincere admiration for the enormous responsibility placed on it by our Nation. It is, therefore, considered a great privilege to present the views of our area to you for your consideration.

The Kaw Valley Drainage District embraces an area along the Kansas River, from its confluence with the Missouri, to a point 10.6 miles up stream.

Within the district there are 18,000 to 20,000 residents of Kansas City, Kans., and Wyandotte County having an assessed valuation of $30 million. The district is traversed by several railroads feeding into the railroad center of the Middle West. Within the district is the heart of the livestock and meatpacking industry of the Middle West. These are only two examples, to illustrate to you, that, whatever happens here in our area has its effect at national level.

The district is primarily charged with flood protection, however, its officers are aware of, and are sympathetic to, all of the other phases of the development of water resources.

In 1951 our entire district was inundated by the gigantic overflow of the Kansas River. Estimates of damage to property in our district ran into several million dollars, not to mention human discomfort, loss of income and inconvenience to our district and a large surrounding area.

It is the hope of the district directors that the Kansas River Basin can move ahead on an accelerated basis for development, including the following:

1. Developments:
   - (*a*) Flood protection.
   - (*b*) Water conservation.
   - (*c*) Pollution abatement.
   - (*d*) Soil conservation.
   - (*e*) Ground-water storage.
   - (*f*) Irrigation.
   - (*g*) Recreation and wildlife development.

2. A minimum of $25 million per annum for a period of 15 to 20 years is needed for flood protection alone. Items (*b*) and (*d*) through (*g*) above could be developed as companion adjunctive projects and should be considered in addition to item (*a*).

Many millions have been spent and are being spent at local levels for item (*c*).

3. All of these services above outlined are needed in the Kansas and Missouri River Basins.

4. These developments should be patterned after the above referenced list (under 1).

5. Sufficient funds should be allocated to give full use and development to the program. There is no economic comparison available for use as a yard stick in the evaluation of water. (When water is plentiful it is nearly valueless, when none is available it is priceless.)

KAW VALLEY DRAINAGE BOARD,
C. W. LONG,
O. F. (JACK) SMITH,
R. D. WHITE.

Mr. PARAMORE. John Adair, president, the Atchison Flood Control & Waterfront Development Association, has a statement to file.

Senator SCHOEPPEL. It will be received and made a part of the record.

Mr. PARAMORE. I have a statement of Emil W. Heck, president of the Kaw Basin Water Management Association, from Lawrence.

Senator SCHOEPPEL. It will be received and made a part of the record.

Mr. PARAMORE. I have a statement from J. S. Welfelt, mayor of the city of Winfield, which I ask to be made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. I have a statement from C. W. Larson, of the Topeka Flood Control & Conservation Association, Inc., which I ask be made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. I have a statement here that I would like to file because I have been requested to. It is from Art Sindt, president of the Osage Valley Flood Control & Water Conservation Association.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. I have a statement from Ottawa, signed by the president of the Marias des Cygnes Valley Flood Control Association, which I wish to have made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

Mr. PARAMORE. I have a statement signed by Oliver D. Rinehart, of the Hillsdale Reservoir division of the Marias des Cygnes Valley Flood Control Association, and others, which I wish to have made a part of the record.

Senator SCHOEPPEL. It may be received and made a part of the record.

(The statements referred to follow:)

STATEMENT OF JOHN A. ADAIR,[1] PRESIDENT, ATCHISON FLOOD CONTROL & WATERFRONT DEVELONMENT ASSOCIATION, ATCHISON, KANS.

SUMMARY

The purpose of my testimony is to highlight the acute water problems that plague the areas along the eastern border of Kansas and along the western border of Missouri, which are traversed by the main stem of the Missouri River itself for a lineal distance of 125 miles, extending upstream northwesterly from the Kansas Cities to the Nebraska line at Rulo. At the same time, and as a guide to successful regional economic water planning in future years, your committee will also be interested to ascertain and project the substantial national and regional economic "use benefits" which are about to be realized by an orderly, yet accelerated, construction program to complete the agricultural levee and 9-foot navigation channel phases of the Pick-Sloan plan.

In the flood plain of the river alone, are over 625 square miles of the richest bottom land in the world, all of which until the Pick-Sloan plan was initiated, was subject to frequent and costly flooding. Also, in this stretch of the river, and yet to be protected from flooding, as contemplated by the Pick-Sloan plan, are the important "old river town," urban centers of Atchison and Leavenworth,

[1] Mr. Adair is also a director, Mississippi Valley Association, executive committee member of Missouri-Arkansas Basins Flood Control & Conservation Association, and member of water resources council, Kansas State Chamber of Commerce.

Kans., and St. Joseph, Mo., the populations of which are 15,000, 20,000, and 80,000. Major industrial plants important to the economic welfare of the area, are located in these cities. These must, in the near future, be accorded the use benefits of flood protection which underwrote, and were promised by, Pick-Sloan legislation, the Flood Control Act of 1944.

I. COMPLETION OF PICK-SLOAN PLAN (AGRICULTURAL LEVEES)

Completion of upstream Missouri River reservoirs has only lessened somewhat the incidence of flooding on this streach of the river. The necessary ultimate and complete protection promised by the program, can most efficiently be achieved by a near-term acceleration of the construction of Pick-Sloan agricultural levees in an orderly program, which is well underway.

Of a total of 22 agricultural levee units between Kansas City and Rulo, 18 are organized, and of which 10 are virtually completed. The total estimated project cost of all of the organized agricultural levee units is $47 million. As of June 30, 1959, over one-third of the estimated cost, $16 million, had been expended. The project cost of four remaining unorganized agricultural levee units in this area is approximately $7 million. Rapid activation of these units is expected to complete the program.

Related Pick-Sloan projects, completion of which if of vital importance to the area, involve the raising of two strategic railroad bridges which cross the Missouri at Atchison and Leavenworth, Kans. The Federal cost of these projects is approximately $3 million.

Just as early completion of the agricultural levee portion of the Pick-Sloan plan above Kansas City, is vital for the flood protection of valuable agricultural lands, communications, and major industries located in the flood plain of the Missouri River at Atchison, Leavenworth, and St. Joseph, Mo., a large economic potential for the States of Missouri and Kansas becomes a reality in the form of flood-free industrial plant sites, with ample water supplies, and which enjoy access to low-cost barge transportation services. Only with these location factors to offer, can the States of Kansas and Missouri become industrialized. and thereby retain perhaps, their most valuable resource—a surplus of native-born labor arising from the mechanization of agriculture, which now resides in rural areas and small towns. The future economies of these States must utilize these human resources in an expansion of job opportunities in industry and trade.

II. COMPLETION OF PICK-SLOAN PLAN (9-FOOT NAVIGATION CHANNEL)

Early completion of the 9-foot navigation channel from St. Louis to the terminal ports of Kansas City, Atchison, and Leavenworth, Kans., and St. Joseph, Mo., contemplated by the Pick-Sloan plan, will strike at a second vital economic problem of our area involving water, namely, that of facilitating the movement of grain and grain products to world markets at the lowest bulk commodity water rates.

The availability of water transportation facilities is a reality at each of these cities, and a balanced volume of inbound and outbound barge tonnage, has come into being at the ports of Kansas City and Atchison, Kans. The rate of increase in tonnage handled at Kansas City, and the bright outlook, is well known. The prospect for a large and increasing two-way tonnage at Atchison, while less generally known, is promising and substantial. This is made possible by the fact that Atchison is the third largest industrial city in Kansas, and in the 1960 season, will be second only to Kansas City, Kans., as a major river-rail grain terminal. There is over 22 million bushels of terminal grain storage in Atchison. The presence of this capacity, which is nearly 10 percent of the annual average production of wheat in Kansas, points up the importance of low-cost barge transportation to the wheat farmer, and the importance to him of early completion of a 9-foot channel on the Missouri, from St. Louis to Kansas City and Atchison.

III. THE NEED FOR RESEARCH (WATER TRANSPORTATION, DOMESTIC AND FOREIGN)

As a corollary of the above, and in the Nation's interest, our association invites the attention of your committee, to the need for basic research, into all of the elements which comprise the cost of transporting wheat—a major surplus commodity—and wheat products from the growing areas, to centers of consumption, both domestic and foreign, with a view to determining the relative efficiency, and competitiveness, ratewise, of domestic water transportation serv-

ices, as compared with the comparable services in competing foreign countries, including Canada. Such a study would seem desirable, since transportation costs frequently constitute a large percentage of the delivered value of bulk commodities. Their level, therefore, frequently determines a commodity's ability to move in given geographical markets. That high labor costs, in certain U.S. industries, relative to other countries, have priced certain American manufacturers out of foreign markets, is a well-known fact of our economic national life. It is important, therefore, to determine whether the cost of domestic water transportation is, and can be expected to remain, at desirable levels, which are competitive with the cost of foreign transportation services.

Attainment of the world's most efficient inland water transportation system on the Missouri to alleviate the wheat problem of Kansas, which poses serious domestic and international problems to our Congress today, should be an objective of our national water transportation policy.

The results of such a study would doubtless bear on both the importance of an early completion of a 9-foot navigation channel from St. Louis to Kansas City, Atchison, and St. Joseph, and also bear upon the consequences of proposals that tolls or user charges be imposed upon navigation on the Missouri River and other inland waterways.

As a further corollary and guide to the Congress as it seeks to develop a sound water transportation policy, our association urges your committee to study the industrial complexes of Germany and Russia, and their underlying river and canal barge transportation systems, with a view to determining not whether the encouragement of water navigation is fair to, or hurts the railroads, but rather whether expanded water navigation services on the inland waterways, particularly on the Missouri, are not a necessity, and vital not only to an efficient growing competitive industrial United States during peacetime, but essential in light of the need for a dispersion of strategic industrial facilities, in the event of war. In view of the fact that an industrial complex can more efficiently be served by a 12-month navigation season, as opposed to a 7- or 8-month navigation season, our association strongly urges that your committee initiate proper basic long-term research, the purpose of which would be to bring into being in the proper decade, a system of slack water navigation or canalization, which will insure that the future industrial and population concentrations in the Missouri Basin oriented to the Missouri River, enjoy optimum water navigation facilities, both in respect to channel depth and duration of season.

Thank you for the privilege of appearing before your committee.

STATEMENT FILED BY EMIL W. HECK AS PRESIDENT AND IN BEHALF OF THE KAW BASIN WATER MANAGEMENT ASSOCIATION, THE CITY OF PERRY, AND THE DOUGLAS COUNTY KAW DRAINAGE DISTRICT

The groups above-named are particularly appreciative that your Select Committee on Water Resources Development came to Kansas and chose Topeka as the location for its hearing. Here in the Kaw Basin, most of us realize the tremendous importance of the work of the Army Engineers and the completion of the recommended projects at the earliest possible date. We feel that the cost, great as it is of the Pick-Sloan plan, is negligible compared to both the economic and recreational benefits to be received through the years to come. The recreational values are merely an incident to the overall picture which includes a pure domestic water supply conservation, times of drought, flood control during wet periods and last, but not least, the absolute necessity of same if our national defense assumes the priority it must have to insure our survival. The general welfare of this Nation is now directly tied to the maximum development of our water resources.

Most of us in the Kaw Basin are not unmindful of the values achieved through other means, namely, soil conservation and watershed districts but these simply supplement the planning of the Army Engineers and should in no way be viewed as a substitute.

The efficient planning by the Corp of Army Engineers, as well as the carrying out of those plans, deserves the commendation of all thinking people. We, in Kansas, have lived on hope, a hope that has in recent years seen some realization of its objectives. We sincerely hope to see more in the near future.

Again let me say, we are grateful to Senators Kerr and Ellender and the entire committee for coming to Kansas. We are honored to have our own distinguished Andy Schoeppel on your committee. Keep up the good work.

STATEMENT BY CITY OF WINFIELD, KANS.

The city of Winfield, Kans., located in the valley of the Walnut River, is virtually without an adequate supply of potable water. This city of 12,000 people, located on the dividing line between the blue stem cattle country to the east and the wheat country to the west, has for decades prided itself in its service to its citizens and its surrounding community. We have in the past not only supplied good water to our citizens, but in time of need to surrounding towns, cattlemen, ranchers, and farmers. Now we need a dependable source of supply of potable water.

Originally the Walnut River was used as a water supply. However, after it became contaminated with brines and oilfield pollution, it was necessary to seek other sources and in 1924 wells were drilled in the Arkansas area some 9 miles from Winfield. These wells served the area well until 1952 when brines again encroached on this area. A move of the well field to a new location, but still within the Arkansas Valley, was only a temporary solution since the whole underground supply is becoming salty. New locations offer only water with chloride contents from 500 to 60,000 parts per million. The quantity is more sufficient, but salt infiltration has ruined the quality.

Studies by the Kansas Geological Survey and the drilling of more than 100 test wells have failed to locate a new source of supply. An attempt was made through the Department of Interior, Office of Saline Water, to obtain for this area a brackish water conversion demonstration plant. However, our city was among those eliminated by the Site selection board.

We now feel that the only future source of supply is by impounding surface water. While the Arkansas-Red-White River report of the Corps of Engineers, Tulsa District, recommended no feasible sites for dams or impoundments based on flood control only, we feel that the value and need of adequate potable water supply for cities in the Walnut River Basin should make such impoundments feasible.

A resurvey by the Corps of Engineers is being made and a feasibility report is to be made in the future. In the meantime, numerous cities in this area are in need of a water supply giving assurance of a potential of 75 million gallons per day, which includes a potential need of the city of Winfield, Kans., of 15 million per day.

If legislation is passed giving full recognition to water supply, flood control, pollution abatement, fish, wildlife, and recreational values we believe an impoundment of surface water along the Walnut River would be entirely practical.

STATEMENT OF TOPEKA FLOOD CONTROL & CONSERVATION ASSOCIATION, INC.

The Topeka Flood Control and Conservation Association has consistently worked with the various agencies of government in the promotion of flood control and water conservation programs. This association is composed of more than 1,000 members resided in the area and its board of directors is representative of the leading citizens in this community. They regularly meet and actively and aggressively look for the early completion of water control projects in this area. We are affiliated with the Missouri-Arkansas Valley Flood Control Association, the Mississippi Valley Flood Control Association, and the National Rivers and Harbors Congress in supporting water control in the national interest.

Local interests in Topeka have invested nearly $1 million in our own flood control projects and we anticipate that we will invest a further sum of more than $5 million. It is necessary in order to protect this investment and the investment of the Federal Government in Topeka's project and the other local protection works that the upstream reservoirs be completed at the earliest possible date.

In order that overall planning may be more efficient and economical, we recommend that a completion schedule be adopted and we believe that there should be a minimum of $25 million per year be made available in order that the program be completed by 1975. Experience tells us that had the upstream reservoirs been completed in 1951, when we experienced the great flood, the local works would not have to be rebuilt. Logically then, to protect our investment and that of the Federal Government, the upstream reservoirs must be in place in order to protect the downstream levees.

Our economy which is becoming so increasingly geared to an adequate water supply must be planned for in the building of these upstream reservoirs. We

must not overlook the fact that by the development of dam sites for flood control, serious detriment would result to the community, and the Nation as a whole, if we use up the few good dam sites which should be developed for an overall water-resource plan. We recommend that water storage be considered in the national interest as more economical than to develop such a program which might be impossible and certainly more expensive at a later date. This area's greatest deficiency is in good reservoirs and dam sites, and we can ill afford to have any artificial restrictions on development of such sites as have such overall potential.

The water program in the Kansas River is vital to the development of the entire Midwest.

Very respectfully,

C. W. LARSON.

STATEMENT OF ART SINDT, PRESIDENT, OSAGE VALLEY FLOOD CONTROL AND WATER CONSERVATION ASSOCIATION, WARSAW, MO.

Gentlemen, I am representing 165 members of the Headwaters Association of Warsaw, Mo., of which I am a director, and 220 members of the Osage Valley Association, of which I am president. We are impressed with the wisdom exercised in the formation of your committee and the type of information that you seek.

The project which we sponsor is the Kasinger Reservoir located 1½ miles above Warsaw on the Osage River. While it is highly important to us, we nevertheless know that its real importance lies in its relation to the other projects in the overall picture of flood control and water conservation in the Mississippi Basin.

Kasinger is the key dam in the nine project treatment of flood control in the Osage Valley Basin which lies in Kansas and Missouri. Five of these projects lie in Kansas, most of which are in the planning or construction stage. Kasinger and Stockton are in the planning stage, while the Pomme de Terre is in construction. One other authorized project, Hackleman Corners in Missouri, has not as yet received appropriations for planning or construction.

Nationally, each basin should carry its share of water development for the purposes of control and conservation. Various competent authorities have quoted the enormous amount of water that our Nation will need by 1980 and by 2000. We believe that to begin with, all projects that have been authorized on the basis of cost-benefit under existing rules should be in the planning stage now. Also, all projects that have been authorized for flood control only should be reexamined to determine how much conservation can be added to permit storage for future demands. This should be done, where possible, while these projects are in the planning stage. Geographically, the areas that need water most are the heavily populated cities. Projects that are located above major cities, such as Kasinger and its relation to St. Louis, should be redesigned for maximum storage. Next, we believe that the presently used methods in determining cost to benefit are not realistic, and that the methods proposed in the Kerr bill should be employed.

We feel that if your committee will arrive at a 1980 and a 2000 figure on the Nation's water needs, and propose construction on the basis of which projects measure up best from the standpoint of the Kerr bill cost-benefit ratios, and tie these facts into demands based on geographic areas, our country's water needs will be best served.

STATEMENT OF RUSSELL CRITES, PRESIDENT, MARAIS DES CYGNES VALLEY FLOOD CONTROL ASSOCIATION

We of the Marais des Cygnes Valley in Kansas feel it is vitally necessary that the programs of the Corps of Engineers of the U.S. Army, the Bureau of Reclamation of the Department of the Interior, and the Soil Conservation Service of the Department of Agriculture, be continued at a steady pace under the direction of Congress.

We feel these agencies are carrying on programs that will properly develop the water resources of the Nation to assure that surplus water in times of plentiful precipitation can be impounded for man's use, industrially, agriculturally, or for municipal use, in periods of drought.

We feel it is the responsibility of the Federal Government to provide programs that will curb floods, keep the soil on farms, and provide water impoundment projects for the benefit of entire valleys and regions.

This work of development is too vast to be undertaken by local groups or State groups. Rivers have their sources in one State, perhaps, then flow through other States to reach the seas and the benefit from these development programs is too far-reaching to be charged against local groups or State groups.

RUSSELL CRITES,
President, Marais des Cygnes Valley Flood Control Association.
LAMAR PHILLIPS,
Advisor to Executive Board, Marais des Cygnes Valley Flood Control Association.

STATEMENT BY OLIVER D. RINEHART

We, the undersigned, all of Miami County, Kans., wish to inform you that we are in favor of the Corps of Engineers overall plan for flood control and water conservation and use in the Missouri River Basin, and expressly urge your honorable committee to take all action necessary to assure the carrying out of such plans for flood control.

We further believe such action would be to the best interest of all the United States and request that such program be carried to its finality as soon as Congress determines it economically feasible.

Dated this 16th day of November 1959.

THE HILLSDALE RESERVOIR DIVISION OF THE MARAIS DES CYGNES VALLEY FLOOD CONTROL ASSOCIATION,
By OLIVER D. RINEHART, *President.*
THE GOVERNING BODY OF THE CITY OF PAOLI, KANS.,
By S. E. HUME, *Mayor.*
[SEAL] J. A. MENDENHALL, *City Clerk.*
INDUSTRIAL DEVELOPMENT COMMITTEE OF PAOLI, KANS.,
By L. M. SCHWARTZ, *Chairman.*
THE CHAMBER OF COMMERCE OF PAOLI, KANS.,
By BRUCE L. DICKEY, *President.*
THE CHAMBER OF COMMERCE OF OSAWATOMI, KANS.,
By WILLIAM W. EDDY, *President.*

Mr. PARAMORE. I have a statement by Harry W. Fisher, chairman of the water resources committee of Fort Scott, Kans., which I ask be made a part of the record.

Senator SCHOEPPEL. It will be received and made a part of the record.

(The statement is as follows:)

STATEMENT OF HARRY W. FISHER RE MARMATON RIVER DAM, FORT SCOTT, KANS.

This impoundment is included within the program of the engineers and is an integral part of the entire Missouri River development plan. The need of this development is attested by the plans of the engineers and much reference data on file with the Budget Department as well as our Senators and Members of Congress.

We earnestly urge an appropriation for planning money in order that development may progress when adequate appropriation is made for this purpose.

We respectfully request your consideration of the Marmaton River Dam in conjunction with the development of the area.

Respectfully submitted.

THE FORT SCOTT CHAMBER OF COMMERCE.
By HARRY W. FISHER,
Chairman, Water Resources Committee.

Mr. PARAMORE. I have a statement that Mayor Ed Camp in the interest of time, asked me to turn in for the city of Topeka.

Senator SCHOEPPEL. It may be received and made a part of the record.

(The statement referred to follows:)

RESOLUTION

A resolution declaring the aims and objectives of the city of Topeka, Kans., to be presented to and filed with the Select Committee on National Water Resources of the U.S. Senate at its public hearing for the State of Kansas to be held in Topeka, Kans., on Wednesday, November 18, 1959

Whereas the city of Topeka, Kans., as a municipal corporation and by its many citizens vitally interested in the problem of water resources in the area of Topeka itself, the watershed of the Kaw River and its tributaries, the State of Kansas and the Nation as a whole has taken an active dynamic and vital part in the urging of water conservation and water control projects at both a local and national level; and

Whereas the city of Topeka, Kans., as a municipal corporation is actively engaged in the completion of the Topeka flood control project; and

Whereas the city of Topeka, Kans., is vitally interested in the furtherance of local protection projects, upstream protection, water reservoirs controlling supply of water, and conservation of the national wealth from the standpoint of protection of both property and persons; and

Whereas the city of Topeka, Kans., advocates strongly the establishment of strong local protection in the Topeka, Kans., area itself and upriver on the Kaw and its tributaries in order to protect both the local projects and the area of Topeka, Kans., and all cities and properties and persons along the Kaw itself; and

Whereas the city of Topeka, Kans., firmly believes that such local and upstream protection projects will result in benefit to the area of the Kaw itself and its tributaries and the Missouri and Mississippi Rivers and the areas affected by those bodies of water; and

Whereas the city of Topeka, Kans., believes that the cost-benefit ratio of such projects and protection is very strongly in favor of both local and upstream protection projects; and

Whereas the city of Topeka, Kans., believes that the problem of control and protection from floodwaters and controlled water supply is of vital importance to the Nation as a whole and the area affected and served by the Kaw River and its tributaries and particularly the city of Topeka, Kans., itself all of which is urgently needed: Now, therefore, be it

Resolved, That the board of commissioners of the city of Topeka does hereby urge the Select Committee on National Water Resources of the U.S. Senate to give favorable consideration to the proposed projects for the control of floodwater and constant supply of water on the Kaw River, including the construction of reservoirs, retention dams, levies, channels, bridges, and channel improvements, and assures the select committee of the continued cooperation and interest of the city of Topeka in all such protection projects.

Adopted by the board of commissioners.

Approved.

E. J. CAMP, *Mayor, City of Topeka, Kans.*

Mr. PARAMORE. I hope I have not missed anybody.

I would like to present Roy T. Evans, former mayor of Augusta, and ask if he may have a minute and a half, Senator Schoeppel.

Senator SCHOEPPEL. Very well.

STATEMENT OF ROY T. EVANS, FORMER MAYOR, AUGUSTA, KANS.

Mayor EVANS. Mr. Chairman and members of the committee, as a former mayor and one interested in water development, I have participated in a study of the city of Augusta's needs, which we feel is typical of the needs of many Kansas towns.

We have present a large number of people from Augusta, who are interested in this hearing. The mayor, city manager, city attorney, most of the council members, representatives of labor, president of the chamber of commerce.

These gentlemen might stand up so you will know they are here.

Their report outlines the needs of a city and the potential economic loss, and by way of abstract this city of 2,600 persons requires 2 million gallons of water per day now. In 50 years it will require 13,500 gallons of water. We do not have that water available. It is outside of our recourses under present city laws, under present State regulations. We stand to lose $1,739 million in total value of goods produced if we do not secure this.

Many other cities face similar problems. We feel this committee should take these factors into recognition in studying the water problem.

Thank you very much.

Senator SCHOEPPEL. Thank you for your statement, Mr. Evans.

(The statement follows:)

STATEMENT OF ROY T. EVANS, FORMER MAYOR, AUGUSTA, KANS.

A STUDY OF FUTURE WATER SUPPLY NEEDS
OF THE CITY OF AUGUSTA, KANS.

Introduction

This study of Augusta water needs and the economic penalties resulting from an inadequate water supply was requested by the Augusta city government. In order to provide data for long-range planning, the period covered in this study is 50 years.

The material presented covers a population forecast, a forecast of water usage and the economic penalties resulting from an inadequate supply of water. This report is a joint project prepared by both Augusta City officers and the technical department of Mobil Oil Co.

The city of Augusta, Kans. is located at the confluence of the Walnut and Whitewater Rivers. Present population is 6,532 and the domestic water supply is furnished by two lakes, with a total storage capacity of 1,500 million gallons, and by a 32-mile pipeline to pumps located in the underflow from the Arkansas River at Mulvane, Kans. The two lakes mentioned impound rainfall runoff and are dependent solely on surface runoff for water. During the last drought period, the water supply of both lakes was exhausted and the construction of the pipeline from Mulvane was then undertaken in order to furnish water for the city.

The pipeline was a joint venture of three refineries and two cities. The refineries participating were Mobil Oil Co. at Augusta, Skelly Oil Co. at El Dorado and Petrofina at El Dorado. The cities participating jointly with the refineries as tenants-in-common in the pipeline venture were Augusta and El Dorado, Kans. The allocation of water for Augusta from this pipeline consists of 850 gallons a minute for the city and 1,050 gallons for the Mobil Oil Co. refinery. This total allocation (both city and refinery) amounts to a daily quantity of 2,590,000 gallons.

Prior to construction of the Mulvane waterline, a water crisis existed in the cities of Augusta and El Dorado. Rather large sums were spent to find additional water supplies. Test wells were drilled, geological studies were made and cloud seeding was tried—all with no results. Meanwhile the city of El Dorado began to transport water through the Kaneb Pipeline from Wichita, Kans., a distance of 35 miles.

The Kaneb Pipeline Co. is a common carrier of refined products and at that time had some pipeline space available between batches of gasoline and fuel oil. Because of the nature of the emergency, a reduced rate was granted for pumping water; however, the monthly cost amounted to about $50,000 per month for 11 months. Mobil Oil Co. at Augusta also found it necessary to use Kaneb's pipeline to pump water from Arkansas City, Kans., a distance of 45 miles at a cost of $23,800 per month for less than 2 months. Unfortunately the Kaneb pipeline no longer has pipeline capacity available and is not a possible source of emergency water supply.

During the drought of 1952–57 the lakes were completely emptied and the Mulvane pipeline was essentially the sole source for Augusta domestic water and for the Mobil refinery. This situation existed for a period of nearly 3 years.

Long-range forecasts based on past weather records indicate that drought conditions will occur in the Augusta area on about a 20-year cycle. With increased population, emergency conditions will occur during the next drought because the Mulvane pipeline cannot furnish adequate supplies. These emergency conditions would cause large expenditures to develop another source of water just as happened in the 1952–57 period.

Another drought will limit water supply to Mobil Oil because it will be necessary for the city to preempt part of their supply to meet bare domestic needs of the city of Augusta. New industry which contemplates locating in Augusta will certainly decide not to do so because of the probability of limited water supply.

ABSTRACT

Present water supply of the city of Augusta will be inadequate during drought cycles. This water shortage may limit refining capaciy at the Mobil Oil Co. refinery and keep new industry from locating in Augusta.

If an increased water supply is made available, estimated water usage will increase to 13,550,000 gallons per day in 50 years.

Lack of an additional reliable source of water will entail economic penalties in terms of both present and possible future industry. Economic penalties in terms of total value of production is estimated to be $524 million for present industry and $1,215 million for potential future industry, with a total of $1,739 million for the next 50 years.

Population forecast

In predictions of future water supply needs, it is necessary to make a population forecast which then serves as a basis for water usage figures. In the case of Augusta, Kans., the population forecast is dependent upon an adequate water supply. Therefore, a forecast was made on a dual basis; first, on the basis of present, and apparently inadequate, water supply and, second, showing population if increased water were available. The forecast of population with present water supply was made by the ratio method which, according to several authorities, best fits this situation.[1 2 3] This forecast is shown in chart I and it is the line labeled "Population Growth, Present Water Supply." This forecast shows a population of 15,000 in Augusta in the year 2010. Growth considered in this forecast is based on area growth as an outlying suburb of Wichita, Kans. It does not consider the possibility of location of new industry at, or very close, to the city of Augusta. The only industrial expansion considered is normal growth in industries already in existence in Augusta.

An estimate of the potential industrial growth, if adequate water supplies were available, was made with the assistance of the local chamber of commerce. Their estimate was based on inquiries by industries seeking new locations and on the potential labor pool available. The chamber of commerce estimates that 4,000 additional people would be directly employed in new industry in the next 50 years. This growth is expected to take place at a relatively uniform rate over the 50-year period. Using a very conservative factor of two and one-half service people, children, and unemployables for each industrial employee, this growth amounts to 14,000 additional people in the year 2010.

If the 14,000 people for industrial growth is added to the 15,000 predicted population with present water supply, the total in the year 2010 then becomes 29,000. In order to predict the rate of growth with additional water supply, a line was constructed to spread this increase in population out over a predicted growth pattern. This line is shown in chart I and labeled "Population Growth, Increased Water Supply." Since this method is somewhat different than the usual population forecasts, it seemed desirable to obtain some confirmation by a separate method. For this confirmation, we obtained the local telephone company's long-range forecast which was based on the number of households in Augusta in future years. This forecast was converted to total population

[1] Paul M. Reid, "Problems and Techniques in Population Forecasting" Journal AWWA 50: 655 (May 1958).
[2] K. L. Kollar, "Some Novel Approaches to Population Studies" Journal AWWA 48: 430 (April 1956).
[3] Robert C. Schmitt, "Forecasting City Population by the Ratio Method" Journal AWWA 46: 960 (October 1954).

using the 1950 census figure of 3.07 people per household. This forecast, extrapolated to the year 2010, is also shown in chart I where it is labeled "Population Growth, Telephone Company Forecast." Agreement between these two forecasts is surprisingly good. The telephone company forecast shows 30,000 people in the year 2010, while the population growth with increased water supply shows 29,000 people for the same year.

Water usage

The forecast of water usage is separated into two sections, the residential demand and the industrial demand. The reason for this separation is that residential demand increase and industrial demand increase do not follow the same general pattern.[4]

Residential demand in this area, is expected to increase at the approximate rate of 2 percent per capita per year.[4 5 6] Present residential demand is about 100 gallons per capita per day (table I). On this basis, growth in usage would continue at a uniform rate to 200 gallons per capita per day in the next 50 years. Calculations show that in the year 2010 domestic demand for 29,000 people would be 5,800,000 gallons per day and for 15,000 people, it would be 3 million per day. If increased water were available, population growth would nearly double the demand for domestic water.

Industrial demand for Augusta will increase from expansion of present industries and from location of new industries in the community or immediate area.

The only existing industry in Augusta which is a major water used is the Mobil Oil Co. refinery, presently processing 40,000 barrels per day of crude oil. Their demand increase will constitute nearly all of the increased usage by present industries. The Mobil Oil Co. refinery's increase in water demand will be proportional to the barrels of crude processed and it will vary in almost direct ratio to processing capacity. At the present 40,000 barrels per day capacity, water usage is about 1 million gallons per day. A growth forecast for Mobil Oil shows it will probably need about 3,750,000 gallons per day by the year 2010.

The predicted increase in refinery usage is based on growth of the domestic refining industry in the United States for the next 50 years. It is assumed that the Mobil Oil Co. refinery will grow in processing capacity at the same rate as the industry as a whole because historically it has followed about this pattern. Growth rate for the industry as a whole is based on total energy demand in the United States. For this forecast we have chosen the figures of the National Planning Commission for total U.S. energy needs as shown in chart II. The oil industry has furnished about 40 percent of these needs in the last decade and will probably continue to strive to furnish the same percentage of total energy needs. Using a ratio calculation on the extrapolated energy demand, the Mobil Oil Co. refinery at Augusta should process about 150,000 barrels of crude per calendar day in the year 2010.

Water demand for this increased capacity was calculated on a proportional basis to obtain the predicted demand of 3,750,000 gallons. This usage figure should be quite conservative because the refinery has always practiced water conservation due to limited water supply. Powell & Bacon[7] show that the average 40,000 barrel per day refinery requires 3,250,000 gallons of water per day. This forecast shows only 3,750,000 gallons per day for a processing capacity of 150,000 barrels of crude.

The water demand resulting from new industrial installations in Augusta is more difficult to forecast. In order to forecast this growth, it was necessary to make several assumptions.

1. No other large water consuming industries, such as the Mobil refinery, would be attracted to Augusta.

2. Because the labor pool available is not inexhaustible, new industries located here would be relatively small. We have chosen the figure of an average of 50 people per industry.

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[4] Jerome B. Wolff, "Forecasting Water Requirements for Distribution Systems" Journal AWWA 49 : 225 (March 1957).

[5] Task Group Report, "Study of Domestic Water Use," Journal AWWA 50 :1408 (November 1958).

[6] Porges R., "Factors Influencing Per Capita Water Consumption," Water and Sewage Works, 104 : 199 (1957).

[7] Shepard T. Powell and Hilary E. Bacon, "Magnitude of Industrial Demand for Process Water," Journal AWWA, 52 : 777 (August 1950).

3. These small industries would fall at the median of industrial-water usage which is about 50,000 gallons per day.[8] The median figure is far below the national average because a relatively small percent of the industries consume a large percent of the industrial water in the United States.

Using the population forecast figure of 4,000 people employed in new industry, we would have 80 establishments. These 80 establishments, each with an individual usage of 50,000 gallons, would have a daily demand of 4,000,000 gallons.

Summarizing the individual demand figures; population 29,000, residential usage 5,800,000, Mobil Oil Co. 3,750,000, new industries 4 million, for a total daily usage of 13,500,000 gallons in the year 2010. Present water supply would be totally inadequate during periods of drought and a new source must be developed to allow this growth to take place.

Economic penalties for lack of adequate water

The calculation of economic penalty in this report is based on total dollar value of goods produced. The reason these figures are used is that dollars added to value by individual manufacturers are very difficult to determine and often quite inaccurate. Therefore, the more reliable figure of total dollar value of goods produced is used.

With the present sources of water, the only time the water supply will become inadequate is during periods of drought. As stated in the introduction, we expect about a 20-year cycle on drought conditions. This anticipated figure is based on both long-range weather forecast and previous weather conditions as we have had droughts in the 1935 period, the 1955 period, and will expect to have droughts in the 1970–80 period and 1990–2000 period. Based on the 1952–57 drought, emergency conditions should exist for about 3 years during succeeding droughts. The only reliable source of domestic water for these periods will be the Mulvane water pipeline.

In order to calculate economic penalties, we have calculated both penalty on existing industry with existing water supply, and penalty due to potential loss of new industry at Augusta.

The penalty to existing industry with present water supply would be confined largely to the single large user, Mobil Oil Co. The city will have to preempt the water allocated to Mobil Oil Co. on the Mulvane line as a matter of necessity. Mobil Oil would, of course, have the options of not increasing the size of the Augusta refinery or installing additional costly water conservation equipment. For this report we have assumed the refinery would be increased in size and water shortage would merely result in loss of output.

For the first drought period, say 1975, Mobil will have grown to 75,000 barrels per day processing capacity and will require 1,875,000 gallons of water per day. The city, with no additional water supply sources, will have grown to at least 9,100 people who will have a residential water demand of 130 gallons per capita. This constitutes a daily demand of 1,180,000 gallons of water per day. The total Mulvane line allocation, as mentioned before, is 2,590,000 gallons per day for both the city of Augusta and Mobil Oil Co. After the city demand is satisfied, there would remain only 1,141,000 gallons per day for refinery use, leaving the refinery short 465,000 gallons per day.

A refinery water shortage of 465,000 gallons per day would necessitate a reduction in crude run of 18,600 barrels per day for a 3-year period. Product value of 18,600 barrels per day of crude processed, based on present prices, amounts to $27,900,000 per year. For a 3-year period, total penalty would be $83,750,000.

A similar calculation for the 1995 period will show a population of 12,600 with refinery capacity 115,000 barrels per day. Water demand for residential use would be 2,160,000 gallons per day. Mobil Oil Co. would require 2,880,000 gallons per day. Taking the residential requirement out of the Mulvane line allocation, this would leave Mobil 2,450,000 gallons per day short on their water needs. The shortage would, in turn, reduce crude run in the amount of 98,000 barrels per day. Total product value on a crude run of 98,000 barrels per day for 3 years is $441 million. Totaling the two drought periods, penalty to existing industry would be $524,750,000.

Economic penalties resulting from loss of new industry

In order to make an estimate for output of potential new industry, we used figures for gross national products and total U.S. employment of nonagricultural

[8] Dwight F. Metzler, R. V. Smrha, and F. C. Foley, "Water in Kansas" (a report to the 1955 State legislature).

employees.[9] Gross national product on a yearly basis in dollars was divided by the number of nonagricultural employees for the second quarter of this year. This computation gives a dollar value of production per capita in the following manner:

$$\frac{\$483,000,000,000}{59,600,000} = \$8,100 \text{ output per worker per year}$$

Assuming that one-half of the per capita growth due to industry will be actively employed, we have calculated an average number of additional people who would be employed in Augusta in the next 50 years if adequate water supply is available. Data in chart I was used to calculate an average difference in population between the line showing "Population With Increased Water Supply" and "Population With Present Water Supply." The calculated average was 3,000 people. These 3,000 people employed for 50 years with $8,100 per year output amounts to a total production output of $1,215 million worth of goods produced.

If we add the $1,215 million loss of product value for potential new industry to the $524 million loss in product value for present industry, the total economic penalty becomes $1,739 million unless Augusta finds another reliable source for water.

R. T. EVANS.

TABLE I.—*Per capita water consumption city of Augusta, Kans.*

Year	Gallons	Population	Per capita consumption	
			Yearly	Daily
1940		3,789		
1945	120,040,000	4,276	28,072	77
1946	169,950,000	3,883	43,767	121
1947	142,970,000	4,263	33,537	92
1948	157,900,000	4,399	33,890	93
1949	158,930,000	4,912	32,255	89
1950	163,200,000	4,916	33,198	91
1951	167,700,000	5,078	30,248	83
1952	198,470,000	5,552	35,747	98
1953	198,870,000	5,636	35,286	97
1954		5,636		
1955	187,115,000	5,686	32,098	88
1956	218,960,000	5,917	37,005	101
1957	215,515,000	6,220	34,648	95
1958	221,840,000	6,183	35,879	98

Mr. PARAMORE. Senator Schoeppel, that concludes the flood control representatives and there has been allocated on your docket for navigation—could I present at this time the representative of navigation?

Senator SCHOEPPEL. Yes; let us do that now.

Mr. PARAMORE. We have one spokesman, I think, allocated 5 minutes.

At this time I would like to present to you the former mayor of Kansas City, Mo., a member of the board of directors of the Mississippi Valley Association, and today representing the Missouri River Shippers Association, Mayor Bill Kemp.

[9] U.S. National Employment Security Division, Employment Statistics.

STATEMENT OF WILLIAM E. KEMP, REPRESENTING THE MISSOURI SHIPPERS ASSOCIATION

Mr. KEMP. Senator Schoeppel, it would take about 5 minutes for me to read this statement. I am going to take 5 minutes and highlight whatever 5 minutes will permit.

Senator SCHOEPPEL. The entire statement will go into the record, and you may proceed to highlight it.

Mr. KEMP. Yes; I will file it. I did not understand I was to have some 25 copies. I could get those and furnish them to the committee at a later time.

Senator SCHOEPPEL. That will be satisfactory, at a later time.

Mr. KEMP. I feel there has been too little understanding of the tremendous significance that navigation on the Missouri River has for the welfare of this whole Missouri Valley stretching from Montana on over into Iowa and through Kansas and Nebraska, the entire valley, that has just about half-million square miles and some 10 million people and that means that 10 million people are going to be better and more prosperous if we can have navigation on the Missouri River, in the most effective form.

Today we do not have it.

Although the dams are practically completed there is yet considerable work to be done upon the river to give us a 9-foot channel and until we get a 9-foot channel we are operating on about a 6-to-7-foot draft of our towboats, of our barges, which means that our freight rate on the Missouri River is approximately 50 percent greater than it is on the Mississippi and on the Ohio where they have a stabilized channel and an assured 9-foot channel.

The work on our 9-foot channel is approximately 95-percent complete from Kansas City to Omaha. It is about 90-percent complete from Omaha to Kansas City, and it is about a little better complete from Omaha to Sious City.

But until it is entirely complete that is on these respective stretches at least, until it is entirely complete it is just like a chain. It is as strong as its weakest link; the river just as good as its shallowest spot.

We are still going to have a disadvantageous barge rate until we get the river completed so that we can with assurance put barges on that river and load them to nine or more feet.

One of the things that we need, we need assured season of from 8½ to 9 months as a minimum for most effective operation.

Now, there is some thought that this is just kind of pork-barrel stuff, but it is furthest from that because of the difference in freight rates between barge and rail. It is so tremendous.

I will give you an illustration. The rail rate for steel from Pittsburgh to Memphis in 1958 was $18 per ton.

The barge rate from Pittsburgh to Memphis for steel was $4.38 a ton.

From Chicago to Memphis the rail rate on steel was $13.60 per ton, while the barge rate was $3.53.

Now, then, in the area served by barges they are in a highly more advantageous competitive position than we here on the Missouri where we cannot get those similar rates or comparable rates until this job is done, and when it is done, and when industry can be assured adequate water supply, for their bankside industries and a stabilized 9-foot channel, industry is going to come to the banks of the Missouri

River and our navigable streams in this valley. That is what happened to the Ohio.

In 1929 when they completed their system of locks and channels I believe the tonnage there jumped about 22 million tons a year. Today it is about 80 million tons a year.

On the Missouri in 1952 our tonnage was 52,000, but in 1958, or in 1959 this past year, our tonnage was 829,000 tons.

So you see percentagewise there has been a very healthy growth, but that represents a mere trifle to the potentials there are available.

In 1952 I believe it was, there was a survey made of 1,500 industrial plants building elevator companies, steel firms, and manufacturers. Since 1950. And it was then estimated that there would easily be a commerce of at least 5 million tons annually when we got a 9-foot stabilized channel.

Well, the barge operators who have studied the situation today think that the potential is far greater than that.

If you would think about what has happened on the Ohio with their stabilized channel with their 9-foot drafts, they have spent, industry has spent some $12 to $15 million on the banks of the Ohio.

Why? Because they had cheap barge rates, and reliable barge service.

What has happened there will happen on the Missouri. Industry is induced to come where it can have low freight rates and adequate supply of fresh water.

So I feel that the little that remains to be done, comparatively little that remains to be done in order to put our great Missouri basin in a competitive position with that of the Ohio and other great river basins.

It seems to me that Congress should take a most favorable view toward expediting so far as possible, this work that has been so far advanced.

Thank you.

The CHAIRMAN. Thank you for your presentation, Mr. Kemp.

Mr. KEMP. Thank you, Senator.

Senator SCHOEPPEL. Thank you, Mr. Paramore, and your group.

(The following statement was forwarded to the committee:)

STATEMENT BY WILLIAM E. KEMP, REPRESENTING THE MISSOURI RIVER SHIPPERS ASSOCIATION

NAVIGATION OF THE MISSOURI RIVER

I am very pleased to have this opportunity to discuss before this Senate committee, navigation on the Missouri River.

Before our interlacing system of railroads came into being, our rivers were our principal highways of commerce and on their banks our chief inland cities were planted and grew to their present greatness.

Before the intervention of the U.S. Army Engineer Corps, here in our Missouri Valley, flowed an unruly, silt-ladened river, more than 2,000 miles in length from its headwaters in Montana to its mouth at St. Louis, draining an area of more than one-half million square miles, within which dwell more than 10 million people—10 million people whose overall economy stands to greatly benefit from the achievement of flood protection and a regulated flow of water in a stabilized channel, that will create adequate water for industry along the banks of this river and reliable river transportation.

From the time of the historic Lewis and Clark exploring expedition, starting in May 1804, down to the advent of railroads in the Missouri Valley, this unpredictable river with its ever-shifting channel and its unmanaged flow, was nevertheless the chief highway of commerce in this valley, and river towns sprang up all along its tortuous course. The little side-wheelers of early day

CHART I

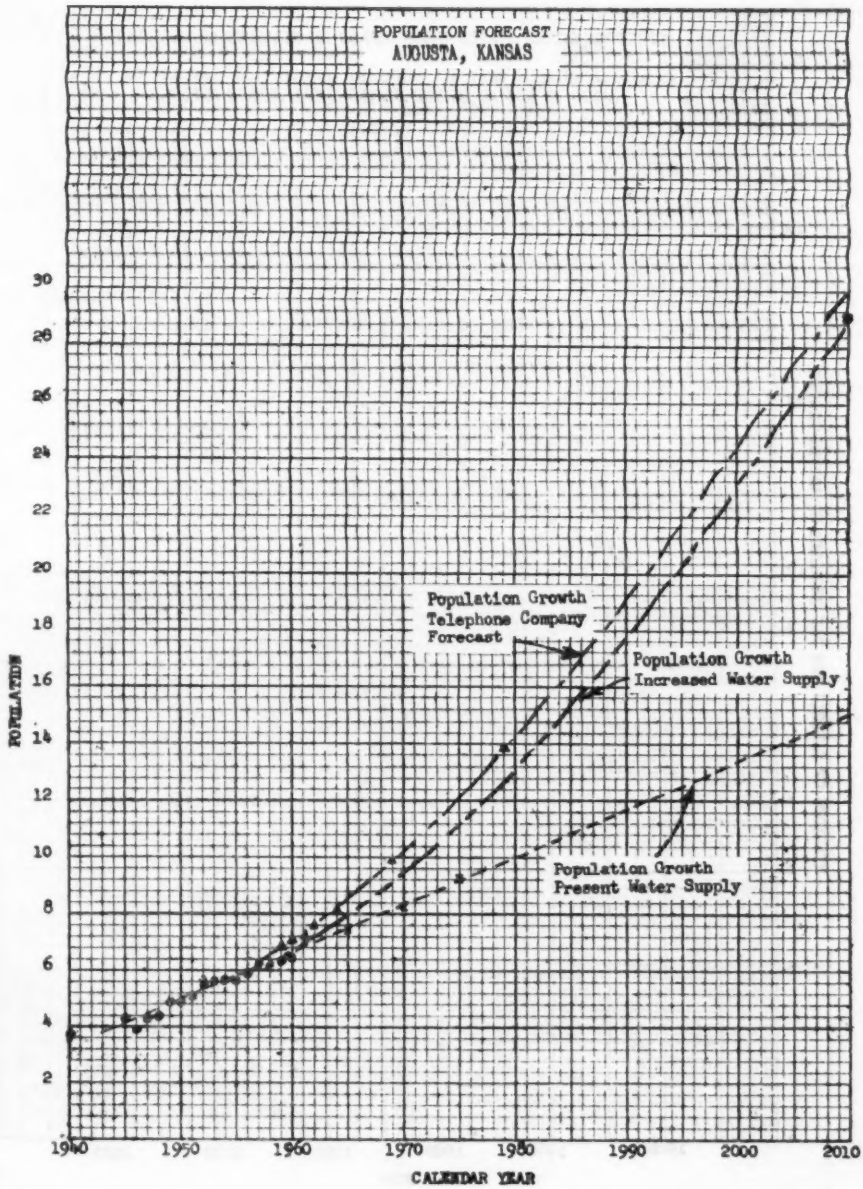
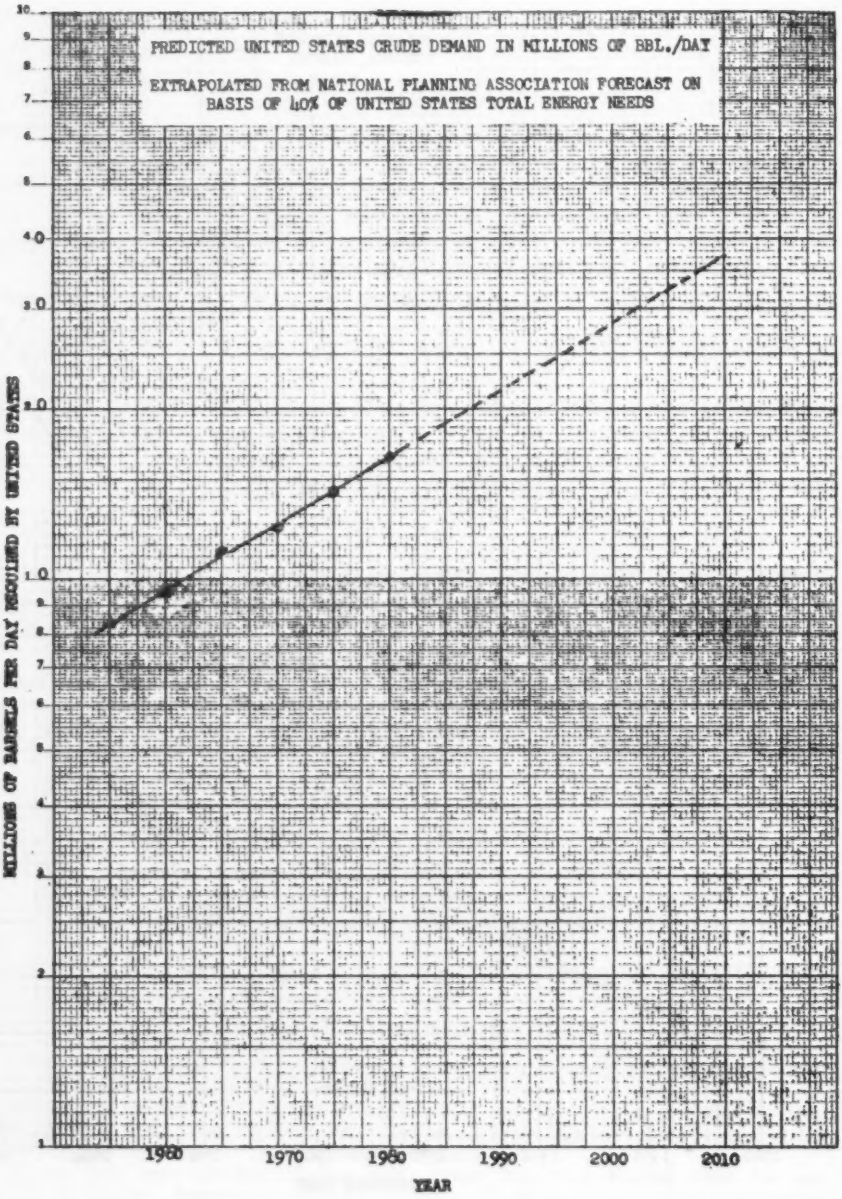
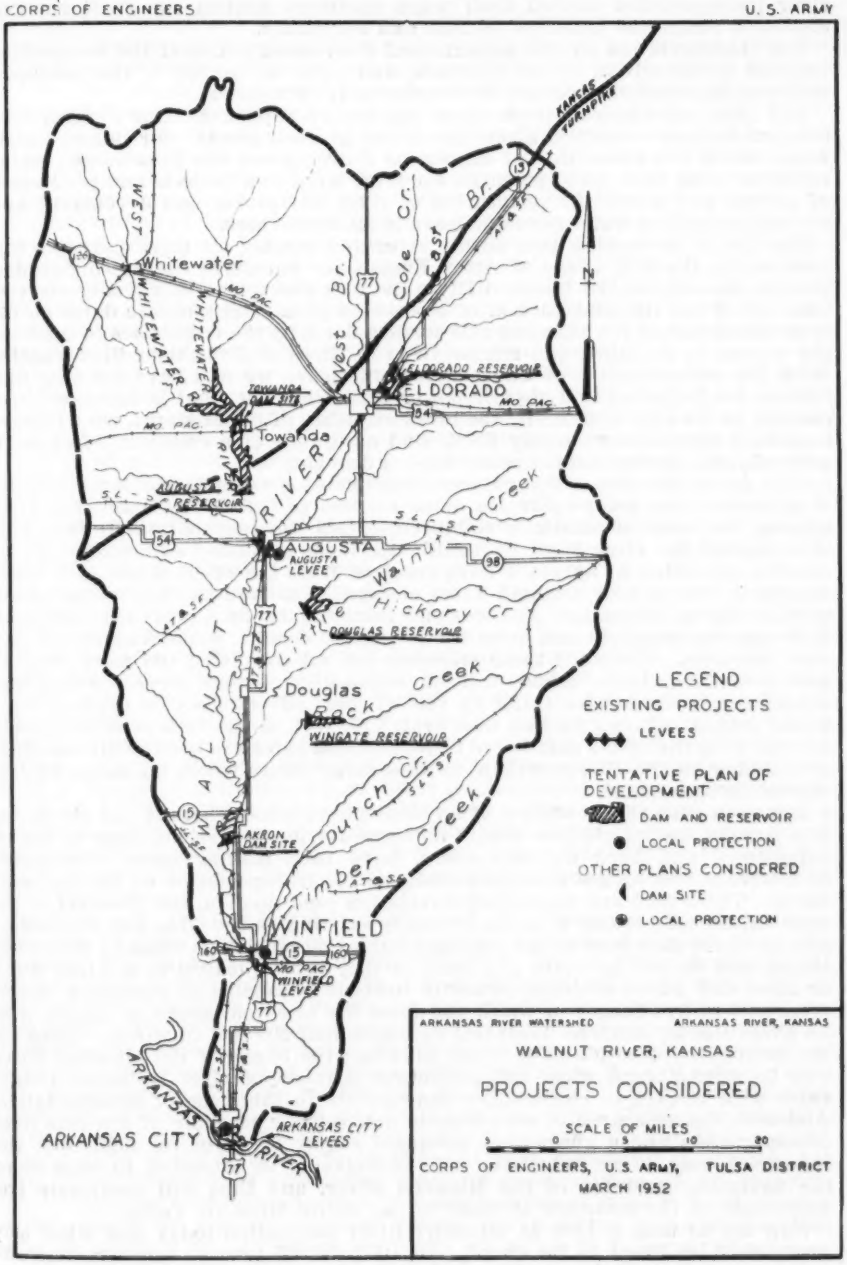

POPULATION FORECAST
AUGUSTA, KANSAS
Population Growth
Telephone Company
Forecast
Population Growth
Increased Water Supply
Population Growth
Present Water Supply
POPULATION
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
1940
1950
1960
1970
1980
1990
2000
2010
CALENDAR YEAR

CHART II


PREDICTED UNITED STATES CRUDE DEMAND IN MILLIONS OF BBL./DAY
EXTRAPOLATED FROM NATIONAL PLANNING ASSOCIATION FORECAST ON BASIS OF 40% OF UNITED STATES TOTAL ENERGY NEEDS
BILLIONS OF BARRELS PER DAY REQUIRED BY UNITED STATES
1960
1970
1980
1990
2000
2010
YEAR


CORPS OF ENGINEERS
U. S. ARMY
KANSAS TURNPIKE
WEST WHITEWATER R.
Whitewater
MO PAC
WHITEWATER RIVER
TOWANDA DAM SITE
Towanda
MO PAC
AUGUSTA RESERVOIR
AUGUSTA
AUGUSTA LEVEE
WALNUT RIVER
West Br. Cole Cr.
East Br.
ATSF
ELDORADO RESERVOIR
ELDORADO
MO PAC
54
77
12
Walnut Creek
Little Hickory Cr
DOUGLAS RESERVOIR
Douglas
Rock Creek
WINGATE RESERVOIR
Dutch Cr.
Timber Creek
AKRON DAM SITE
WINFIELD
MO PAC
WINFIELD LEVEE
ARKANSAS RIVER
ARKANSAS CITY
ARKANSAS CITY LEVEES
LEGEND
EXISTING PROJECTS
LEVEES
TENTATIVE PLAN OF DEVELOPMENT
DAM AND RESERVOIR
LOCAL PROTECTION
OTHER PLANS CONSIDERED
DAM SITE
LOCAL PROTECTION
ARKANSAS RIVER WATERSHED
ARKANSAS RIVER, KANSAS
WALNUT RIVER, KANSAS
PROJECTS CONSIDERED
SCALE OF MILES
5 0 5 10 20
CORPS OF ENGINEERS, U.S. ARMY, TULSA DISTRICT
MARCH 1952

river transportation battled their ways upstream against the swift current, sandbars, snags and extremes of high and low water.

But transportation on this unharnessed river could not meet the competition incident to the advent of the railroads, and with the coming of the railroads, traffic on the untamed Missouri River practically disappeared.

And then something of tremendous importance happened. Our Federal Government became concerned about one of our greatest assets—our inland waterways—about the prevention of disastrous floods; about the then-wasted water resources with their great potential for large irrigation projects and production of power, and about the restoration of river navigation and a constant and adequate supply of water for municipal and industrial uses.

The job of harnessing this unruly river and serving all these purposes was assigned to the U.S. Corps of Army Engineers. Intensive engineering studies were made and, for the Missouri River the Pick-Sloan plan was finally evolved. This called for the construction of a series of great multipurpose dams on the upper stretches of the Missouri and smaller dams on the tributaries to impound the waters in floodtime and release them in times of drought or little runoffs. With the consummation of this planned enterprise, we will have not only provisions for irrigation and electric power generation but what is of more direct concern to the area drained by the lower stretches of the Missouri, we will have insurance against devastating floods and assurance of a constant 9-foot navigable channel during times of either flood or drought.

This great enterprise, though now incomplete, is nevertheless far advanced. A system of five great upstream dams is close to full realization. The river channel has been substantially stabilized, except for a comparatively few short stretches of the river from its mouth upstream to as far as Omaha. To be specific, according to figures I have received from the office of the U.S. Army Engineers, the aim of a stable 9-foot channel from Kansas City to the mouth of the river is 95 percent complete and from Omaha to Kansas City the work is 90 percent complete and from Sioux City to Omaha, approximately 54 percent complete. But until these stretches are all completed the most effective and economical barge traffic will be impossible. Under present conditions, barges can be loaded for traffic on the Missouri River only to a draft of from 6 to 7 feet, as against loading to a draft of 9 feet on the Ohio and Mississippi Rivers, with the result that barge transportation rates are necessarily considerably higher on the Missouri than on these other rivers where an assured 9-foot channel is maintained.

But even with this condition of an incompleted 9-foot channel and the necessity for the use of shallow drafts in barge towing operations, men of vision, experience, and hard business sense, have been making large investments in towboats and barges especially designed for transportation on the Missouri River. These men are visualizing navigation conditions on the Missouri in the near future comparable to those presently existing on the Ohio and Mississippi Rivers where they have in use standard barges measuring as much as 200 feet in length and 40 feet in width and built so they can be loaded to a 9-foot depth or more and where a single, powerful towboat is capable of pushing a tow of from two to five barges in width and from five to seven barges in length, with on overall of as much as 1,500 feet in length and 200 feet in width. Certainly the competitive position of industry all along the banks of the Missouri River will be strengthened when full advantage is taken of river transport freight rates with respect to commodities appropriate to this type of transportation. And with the assurance of an adequate and regular schedule of low-rate river transportation and a guaranteed adequate supply of water for municipal and industrial uses, large industries will undoubtedly be attracted to sites along the navigable stretches of the Missouri River, and thus will contribute tremendously to the economic strength of our entire Missouri Valley.

Now let us take a look at Missouri River navigation today and what may reasonably be hoped to lie ahead. In 1952, 59,285 tons of commercial traffic was carried on the Missouri River. In 1953, with two privately owned common carriers, the Federal Barge Lines and the Sioux City-New Orleans Lines started regularly scheduled operations on the river as far upstream as Omaha. These operations have been supplemented by several contract carriers. The principal cargoes of the common carriers have been steel products, grain, molasses, petroleum, chemicals, alfalfa products, and various miscellaneous items. From a traffic of 152,000 tons carried on the Missouri in 1953, the tonnage carried in 1958 increased to approximately 585,000 tons and the tonnage carried on the Missouri River in 1959, increased to 829,000 tons—this notwithstanding a long strike that curtailed the operations of the Federal Barge Lines. While percent-

agewise this indicates a healthy growth of river traffic, it is only a trifle compared to the potential commerce that is now and will become available for low-cost barge traffic. Based on a survey of 1,500 industrial plants, building and elevator companies, steel firms and manufacturers, made in 1950, it was estimated that a commerce of 5 million tons annually could reasonably be expected to develop for shipment by barge on the Missouri River. Some of the barge operators believe the potential within the next few years is substantially greater than this figure. The carriers have constructed and are continuing to construct new and more powerful towing equipment designed especially for the peculiarities of the Missouri River, and to increase their fleets of barges. Terminal facilities are being improved or constructed at Kansas City, Omaha, Nebraska City, St. Joseph, Atchison, Jefferson City, and Chamois. Lost time from grounding is consistently decreasing with progress in bank and channel stabilization. In the past year between Kansas City and the mouth, the percentage of time lost from groundings amounted to only 1.5 percent of total operating time and between Kansas City and Omaha, 2 percent.

With the final completion of an assured 9-foot channel, barges can be loaded to a draft of 8½ feet as against a 6- to 7-foot draft to which they are limited today. This, of course, will mean a much more economical operation and we may reasonably assume a lowering of barge tariffs on the Missouri River.

The stabilized 9-foot channel for navigation on the Missouri River carries with it the assurance of an adequate water supply for industrial uses, which will encourage expansion of existing plants and will undoubtedly attract new industries along the banks of the Missouri River, which, in turn, will greatly strengthen the economy of the entire Missouri Valley. In support of this thesis may I call attention to what has happened on the Ohio River.

At the turn of the century, the Ohio River was carrying around 5 million tons of commerce per year. With the completion of its present system of locks and dams in 1929, it was carrying 22 million tons of commerce annually. Since then river traffic on the Ohio has steadily and rapidly increased until today that river is teaming with the traffic of almost 80 million tons per year.

Whence came this vast increase of river traffic? It has come from the billions of dollars invested in new and expanded industry on the banks of the river that insures an ample supply of water for industrial uses and highly advantageous rates of water transport. The drawing power for industrial locations, of an almost unlimited water supply for industrial use, and a dependable source of low-priced water transportation, on a river connecting with and a part of an overall system of approximately 7,000 miles of connecting inland waterways, is demonstrated by the fact that since World War II some $15 billion has been invested in new and expanded industrial plants on the banks of the Ohio River.

Many of our great industrial giants, such as Aluminum Co. of America, Reynolds, Olin-Mathison, General Electric, Westinghouse, Goodyear, Goodrich, American Rolling Mills, Standard Oil, Gulf Oil, Texaco, the Celanese Corp., and many others, have yielded to the lure of adequate industrial water supply and low cost transportation afforded by the reliably navigable channel of the Ohio River. The inherent advantages from a freight rate standpoint of water transportation over rail, explains certainly in large part this movement of industry to the riverbanks of the Ohio. For illustration, the rail rate for steel from Pittsburgh to Memphis in 1958 was $18.80 per ton. The barge rate from Pittsburgh to Memphis for steel was $4.38 per ton. From Chicago to Memphis the rail rate on steel was $13.60 per ton, while the barge rate was $3.53 per ton.

In the light of the foregoing facts, it would seem reasonable to assume that when the Missouri River can offer comparable advantages of an adequate water supply for bankside industries and barge transport rates to those existing on the rest of the Mississippi River system, new industry will seek locations along the banks of the Missouri and thereby contribute to an improved economy in this great Missouri Valley. All this will come about with the completion of an assured stabilized 9-foot river channel and a minimum of an 8½-month barge transportation season, and the manufacturer in this area will pay less for his steel and the farmer will get more for his grain, due to the lower barge freight rates.

Senator SCHOEPPEL. The next group is the general statement concerning water and pollution.

The coordinator is Dr. Richard Nelson, chairman, Kansas State Board of Health.

Dr. Nelson, we would be glad to hear from you at this time.

STATEMENT OF DR. RICHARD NELSON, LAWRENCE, KANS., CHAIRMAN, KANSAS STATE BOARD OF HEALTH

Dr. NELSON. Mr. Chairman and members of the committee, my name is Richard Nelson, from Lawrence, Kans.

I am the chairman of the Kansas State Board of Health.

The Kansas State Board of Health was organized in 1885, and has been concerned with drinking water in the State of Kansas since that time.

I would like to present Mr. Dwight Metzler, the engineer of the State board of health, who is here to present a statement of our views concerning the role of the Federal Government in water quality matters.

Mr. Metzler.

Senator SCHOEPPEL. The committee will be glad to hear from you, Mr. Metzler.

STATEMENT OF DWIGHT METZLER, TOPEKA, KANS., DIRECTOR, DIVISION OF SANITATION, KANSAS STATE BOARD OF HEALTH

Mr. METZLER. Mr. Chairman and members of the committee, my name is Dwight Metzler. I am the chief engineer for the Kansas State Board of Health.

The Kansas State Board of Health has been officially concerned with the quality of drinking water and the prevention of pollution since 1885. The basic statutes which specifically designate the board as the official water quality agency for the State were enacted in 1907, with subsequent amendments as necessary to keep up with the expanding technology and the increasing demands made upon the waters of the State.

As has been indicated, we assisted in preparation of the general statement of water problems in Kansas. My purpose here is to supplement the general references to water quality in Mr. Smith's presentation.

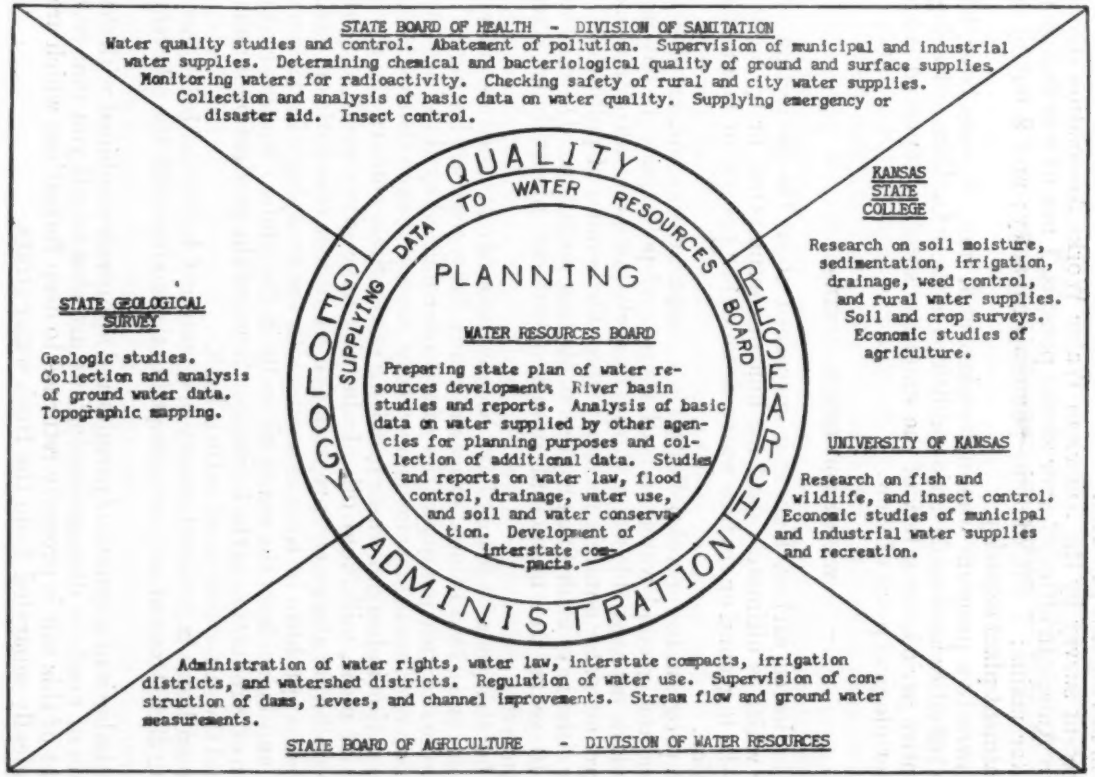
First, will you note the chart showing the responsibilities which the State agencies of Kansas have in the comprehensive water program of the State. You will observe that there is a very minimum of overlapping between the programs, and that coordination and planning are the functions of the State water resources board.

The Kansas State Board of Health is responsible for water quality activities extending from the drinking water supplies of the farmer and city dweller, to the surface and underground waters which receive wastes from the cities and industries of the State.

We believe that a great deal can be done within the State to conserve and wisely use water by careful cooperation and well developed programs in which individual citizens and local and State governments participate.

I will review the State program briefly as it applies to water quality so that you may know that these words are backed by action.

The remainder of the statement will be aimed at those problems which are primariy beyond the authority and or resources of the State to solve.


STATE BOARD OF HEALTH - DIVISION OF SANITATION
Water quality studies and control. Abatement of pollution. Supervision of municipal and industrial water supplies. Determining chemical and bacteriological quality of ground and surface supplies. Monitoring waters for radioactivity. Checking safety of rural and city water supplies. Collection and analysis of basic data on water quality. Supplying emergency or disaster aid. Insect control.
QUALITY
SUPPLYING DATA TO WATER RESOURCES BOARD
GEOLOGY
RESEARCH
ADMINISTRATION
PLANNING
WATER RESOURCES BOARD
Preparing state plan of water resources developments. River basin studies and reports. Analysis of basic data on water supplied by other agencies for planning purposes and collection of additional data. Studies and reports on water law, flood control, drainage, water use, and soil and water conservation. Development of interstate compacts.
STATE GEOLOGICAL SURVEY
Geologic studies. Collection and analysis of ground water data. Topographic mapping.
KANSAS STATE COLLEGE
Research on soil moisture, sedimentation, irrigation, drainage, weed control, and rural water supplies. Soil and crop surveys. Economic studies of agriculture.
UNIVERSITY OF KANSAS
Research on fish and wildlife, and insect control. Economic studies of municipal and industrial water supplies and recreation.
Administration of water rights, water law, interstate compacts, irrigation districts, and watershed districts. Regulation of water use. Supervision of construction of dams, levees, and channel improvements. Stream flow and ground water measurements.
STATE BOARD OF AGRICULTURE - DIVISION OF WATER RESOURCES

PRESENT FUNCTION OF STATE AGENCIES IN WATER ACTIVITIES

WATER SUPPLY

The State has an active, aggressive program for improving the quality of water supply. Five years ago, 169 of the State's 426 cities were rationing water. The problem of water shortage is not new and Kansas was not particularly unusual among the Western States at least, in having this problem.

A recent survey by the American Water Works Association shows that in American cities of over 25,000 persons, 1 out of 5 is deficient in water mains; 1 out of 3 in pumping capacity; and 2 out of 5 in treatment plant capacity.

A corrective program was undertaken and, now, 5 years later, 93 of the 169 cities have made major additions to their facilities. During this entire period, the safety of the water has steadily improved from a bacteriological point of view.

WATER POLLUTION CONTROL

As indicated earlier, Kansas is concerned about the protection of water which is ultimately used for human consumption, or by industries—be it ground or surface water, from either natural or manmade pollution.

The program to control pollution is a comprehensive one, involving surface and ground water and all sources of pollution. It has increased the net available water supply by reclaiming reaches of streams and ground water aquifers formerly unusable because of pollution.

Our cities have made fine progress in abating pollution. During the past 10 years, 214 municipal sewage treatment plants have been constructed.

So far this year 23 plants have been completed; 24 more are under contract, and 17 additional cities are ready for a contract letting.

Despite the growing quantities of sewage collected by the cities, the condition of Kansas streams is markedly improved over that of 1949.

The major industrial waste problems of the State concern the processing of meat, milk, and oil. Industries have given good support to the pollution abatement program and we believe this will continue.

A special problem in Kansas occurs with the pumping of a mixture of oil and brine from the many oil wells in the State. Kansas ranks fifth in oil production of the 50 States. Some of the production is quite old, and the salt-water-to-oil ratio is high.

One million, six hundred twenty-one thousand barrels of brine, containing 23,400 tons of salt, are pumped to the surface with the oil every day.

On the basis of a system of permits and approvals combined with the benefits of machine data processing, we are able to tell you that 96.9 percent of this salt is properly returned to deep formations which are geologically separated from the fresh water strata.

The following table showing the number of adequate brine disposal systems installed by years, will be helpful to the committee in evaluating this program:

	Systems		Systems		Systems
1936	4	1945	95	1954	186
1937	1	1946	89	1955	258
1938	3	1947	91	1956	322
1939	37	1948	97	1957	317
1940	65	1949	126	1958	488
1941	49	1950	156	1959	319
1942	70	1951	169		
1943	86	1952	133	Total	3,492
1944	139	1953	192		

I understand that your committee is more interested in principles than in specific legislative proposals which may now be before the Congress or which may be proposed.

I shall not, therefore, refer to specific bills where some of those may be pending for your study. I hope that you will consider applying these principles to current or to future legislation and appropriations.

PUBLIC WATER SUPPLIES

The regulation of public water supplies to assure safety rests with the States, and this should continue. However, recent data show a surprisingly high percentage of cities with inadequacies in quantity, pumping, transmission or treatment facilities. These deficiencies affect the national welfare and are therefore, a concern of this committee.

It is suggested that the U.S. Public Health Service be encouraged to develop a program with the State health departments to assure adequate, safe public water supplies. This might include program grants to States for a limited time, and technical advice, where needed.

Planning loans available to cities through the Federal Housing Administration are helpful and are used by some Kansas cities. We do not believe that construction loans or grants are needed in Kansas.

Need for dilution water and low-flow supplementation: Where State water plans shows the need, and specifically in Kansas, we believe that Federal reservoirs should be designed with specific storage allocated to maintaining adequate minimum streamflow. The importance of this to fish and wildlife is frequently mentioned, but in Kansas this is even more important from the standpoint of municipal and industrial growth and agricultural development.

At the time Federal reservoir projects are planned and constructed the need for dilution water and low-flow supplementation may not be fully developed. As State and local needs for low-flow supplementation grow, both State and local agencies should have the option to acquire this storage by the repayment process.

Let me give an example. Studies by the State agencies have shown that the quantity of water in the Kansas River is adequate to support great growth of both cities and industries along its course.

However, these studies point out that even with the best water purification and waste treatment techniques now known, low-flow supplementation is necessary in order to have a satisfactory quality of water for the industry which the present quantity can support.

This assumes, of course, that the wastes will be fully and carefully treated before they are discharged to the stream.

BASIC DATA

Policy decisions must be based upon sound data. Whereas the available hydrologic data collected by the U.S. Weather Bureau, U.S. Geological Survey, and other agencies, is reasonably good, the gaps in water quality information are substantial and their lack hampers sound policy decisions.

The Kansas State Board of Health maintains 39 sampling stations along the streams of the State for collection of basic data on chemical quality.

Kansas has a long tradition in this field in that some of the earliest surface water quality analyes were made by the State water survey, a 19th century forerunner to the present sanitary engineering laboratory of the State board of health.

Federal policies to strengthen the role of the States in collecting these data on a uniform basis should be encouraged. U.S. Geological Survey studies of chemical quality of surface waters have been helpful and the water quality network of the U.S. Public Health Service should be extended and more closely integrated with data collected by the States. That these stations monitor for radiation contaminants is commendable, the data are particularly helpful to Kansas.

As in medical practice, missile development, or other scientific endeavors, continuing research is needed to keep pace with the increasingly complex wastes which are being discharged into waters and the increasing demand for water to support municipalities, agriculture, and industry.

Specifically, we support appropriations to the research efforts of the Taft Sanitary Engineering Center at Cincinnati, and recommend increasing the proportion of research funds from the National Institutes of Health channeled into water quality projects.

Kansas will expend its efforts in this area during the next year with the construction of a new environmental health research center, much of which will be used for research in water quality related problems.

One-half of this new laboratory is being paid by private gifts to the University of Kansas. We except that much of the research in this center will be financed by non-Federal resources, but some of the projects should be sponsored by the National Institutes of Health and the National Science Foundation.

FEDERAL WATER POLLUTION CONTROL ACTIVITIES

The Federal Water Pollution Control Act delegates the primary responsibility for pollution abatement to the individual States, but in its supportive role in enforcement, the promotion of uniform standards, and in research, the Federal act has been particularly valuable.

We believe that the U.S. Public Health Service has used its enforcement powers in this region wisely. There is, however, one serious shortcoming of the law. That is in its construction grants provision. If construction grants are to be made to municipalities which qualify for them, then sufficient money should be appropriated by Congress to give assistance to all eligible communities.

Because the amount of money is about 50 percent of that needed in Kansas to give assistance to all eligible communities, 43 cities received assistance but another 38 cities built sewage treatment plants without it in the first 3 years of the program, the inadequate grants may have a deterrent effect upon sewage works construction.

Thank you for the opportunity to present these views. If you have questions, I'll try to answer them.

Senator SCHOEPPEL. Thank you, Mr. Metzler.

Mr. NELSON. If I could present Mr. Wilbur Moffatt, who is president of the Kansas City Sewage & Industrial Wastes Association, he is superintendent of sewage and sewage treatment at Chanute, one of the outstanding men in his field, for a statement from his association.

Senator SCHOEPPEL. We are very glad to hear from you, Mr. Moffatt.

STATEMENT OF W. K. MOFFATT, CHANUTE, KANS., KANSAS SEWAGE & INDUSTRIAL WASTES ASSOCIATION

Mr. MOFFATT. Senator Schoeppel, my name is Wilbur K. Moffatt, and I am the chairman of the Kansas Sewage & Industrial Wastes Association.

The membership of the Kansas Sewage & Industrial Wastes Association is made up largely of persons responsible for the management and operation of plants for the treatment of municipal and industrial wastes.

Our primary job is to safeguard the public health and to prevent pollution of the waters of the State, but under most conditions with adequate plant facilities and with good operation, we cannot only protect against degradation of streams which receive wastes, but actually can effect what amounts to an increase in the new water supply available for use by salvaging waste waters.

However, to do this, even with the best of treatment, some dilution of treated wastes is required, and in the case of certain inorganic industrial wastes containing chlorides, sulfates, or other substances which cannot economically be removed, dilution may be the only practical method of disposal.

With the growth of cities and the expansion of industries, this matter of dilution water is becoming increasingly important.

Because of the extreme variability of flow in most Kansas streams, it is essential to store flood waters for release in times of low stream flow to provide the quantity of dilution water necessary to maintain water quality.

Minimum low-flow requirements based on needs for dilution water have been established for present and expected future needs in Kansas by State and Federal agencies.

Engineering studies indicate that the posttreatment dilution requirement may be a major factor in establishing the amount of water supply storage to be provided in reservoir projects. The degree to which such storage is provided will have a great influence on the economic development of the State.

In view of this situation, we recommend that the Federal planning and construction agencies, such as the Corps of Engineers and Bureau of Reclamation, take this water need into account in their work on reservoir development in Kansas.

Possible future alternates to the use of dilution water for waste disposal might lie in the development of new or improved methods of waste disposal or treatment. Presently, some research along these lines is being conducted by the U.S. Public Health Service at their Environmental Health Center in Cincinnati.

We recommend that this work be continued and expanded as rapidly as possible.

In addition to the special interest which our group has in waste treatment, we also have a general interest in water resources. We recognize the value of the planning activities of both State and Federal agencies in the water resources field.

We also know that adequate basic data is essential to sound planning and recommend that increasing attention and support be given to all agencies engaged in basic data collection, particularly the U.S. Public Health Service, the U.S. Geological Survey, and the U.S. Weather Bureau.

Thank you.

Senator SCHOEPPEL. Thank you, Mr. Moffatt.

And thank you, gentlemen, for presenting these statements

Senator SCHOEPPEL. Next is a general statement concerning water and fish and wildlife.

The coordinator is Dave Leahy, director, State forestry, fish and game commission.

Dave, it is good to have you up here today and see you again.

STATEMENT OF DAVID LEAHY, PRATT, KANS., DIRECTOR, STATE FORESTRY, FISH AND GAME COMMISSION

Mr. LEAHY. Thank you, Senator.

My name is David Leahy. I am the director of the Kansas State Forestry, Fish and Game Commission.

The Forestry, Fish and Game Commission, in addition to its stewardship over the State's fish and wildlife resources, has the additional responsibility of providing Kansans with recreational areas and recreational facilities.

In this statement, therefore, we propose to discuss with you the fish, wildlife, and recreation needs of Kansas as they relate to the existing,

authorized and potential reservoirs built or are to be built by the Corps of Engineers and the Bureau of Reclamation.

We will be emboldened to recommend the building of more reservoirs as we are firmly convinced that more are needed.

We will present also for your study and consideration certain modifications in the existing Coordination Act, as well as changes in the policies of the construction agencies.

These changes will be suggested because of a firm and conscientious belief on our part that the changes will be beneficial to all concerned, and are long overdue.

That there is need for more water in Kansas for fish, wildlife, and recreation, is not debatable. This State cannot boast of a single natural lake, nor has it been endowed with a great deal of natural surface water.

Yet, the intense interest in water and water use is evidenced by the record. One out of six Kansans hunt waterfowl or other game species. The ratio of anglers is higher still, one out of four.

The number of Kansans addicted to water skiing and boating is almost incalculable.

Anglers, for the most part, find their best fishing opporunities at the 35 or more State lakes built by the commission; the six Federal reservoirs which have been built in Kansas and at the several small water supply reservoirs built by counties and municipalities.

The record shows that Kansas ranks 10th in the Nation and second in the central flyway in the number of migratory waterfowl stamps sold. The reasonably good waterfowl hunting that we have had in Kansas is largely due to the establishment of waterfowl management and hunting areas by the commission and to its initiation of sound waterfowl management practices at the Federal reservoirs.

These facts and figures have been stated in an effort to indicate to you the intense interest Kansans have in hunting and fishing.

In the years to come, because of an expected increase in population figures, this interest is bound to increase and to expand. The only way we will be able to satisfy that increased interest and demand for fishing, hunting, and recreation opportunities, is to build more reservoirs.

There are several areas in Kansas critically in need of more water and the benefits it provides.

In my judgment, the most critical area from the viewpoint of fish, wildlife, and recreation management, is that part of the State lying within the Arkansas River Basin. This basin, including almost one-half of Kansas, is bounded on the west by Colorado, on the south by Oklahoma, and on the east by Missouri. It includes the city of Wichita and many other heavily populated counties.

Within this large and heavily populated section of the State, there is but one completed Federal impoundment, Fall River, and only two others under construction, Toronto and Strawn, in the extreme eastern part of the basin.

The State's largest city, Wichita, is located in about the center of the basin and nearly 100 miles removed from the reservoirs just mentioned.

The western part of the basin, including Liberal, Dodge City, Garden City, Hugoton, and Syracuse, is experiencing a heavy growth in population due to the industrialization, and oil and gas production.

If we may, we would enthusiastically recommend that serious consideration be given to the early completion of the Cheney Reservoir near Wichita, and the Hartland Reservoir near Syracuse.

The Cheney Reservoir would be beneficial to Wichita, Hutchinson, and the many other cities and communities in south central Kansas.

The Hartland Reservoir would equally benefit western Kansas, northwestern Oklahoma, and southeast Colorado.

Another critical area is the northwest Kansas section of the Missouri River Basin. The critical situation existing in this part of Kansas would be rectified and certainly lessened if construction funds were made available to the Bureau of Reclamation for completion of the Norton and Glenn Elder projects. These projects have been authorized.

A third area of need is northeast Kansas. This, too, is a heavily populated part of the State, including Kansas City, Topeka, Leavenworth, Lawrence, Olathe, and Ottawa. These communities also are far removed from existing reservoirs.

The construction of the authorized Perry project would go far toward alleviating the need in this section of Kansas.

In view of the increased usage of reservoir areas by recreationists, there is an evident and urgent need for the Congress, the Corps of Engineers, and the Bureau of Reclamation to revise their recreation policies and programs. The policies and programs adopted a few years ago are now outdated and not good enough to cope with the problems of today.

The problem? Longer weekends, more holidays, two or more boats in every backyard.

The Bureau of Reclamation has three reservoirs in Kansas. There are two relatively new. The records of a year ago show that close to a million persons were area patrons. Percentagewise, this figure represents the following:

	Percent
Anglers and hunters	25
Boaters and skiers	21.3
Sightseers	34.9
Picnickers	8.6
Campers	5
Swimmers	5.2

The facilities now existing at the reservoirs were, according to competent observers, inadequate to take care of the visitors in a proper manner. This regrettable situation, deplored by the Bureau and criticized by many, is due to a lack of money necessary to properly and fully equip the area with access roads, boat ramps, boat docks, informational signs, change houses, picnic equipment, campgrounds, et cetera.

The projects of the Corps of Engineers are in a more favorable position. Indeed, the corps operates under one congressional act, the Bureau under a less favorable one.

The corps is authorized and provided with funds to develop and build recreation facilities at their flood control projects.

The Bureau also may build recreation facilities providing they can collect the cost thereof from outside interests.

This means that a community near a flood control project is assured of some recreation facilities while those near a Bureau of Reclamation project can get them only if they pick up the tab.

In order to correct this apparent inequity we would urge the Congress to grant authority to the Bureau to include in all new project planning the cost of such recreation facilities as may be deemed necessary by the Bureau, the National Park Service, and the appropriate State recreation agency; and, further, that funds so allocated and expended be considered as a nonreimbursable item.

We would urge also that the Congress require the Corps of Engineers to coordinate and plan recreation development work with the appropriate State recreation agency. Such coordinated planning would assure uniformity of programs and installations in States where jurisdictional duties are in the hands of two, three, or even four engineer districts.

We commend the Congress on its action in making the August 1958 amendments to the earlier enacted Coordination Act. By reason of these amendments a more effective integration of a fish and wildlife program with the program of Federal water resource development has been made possible.

The amended act clearly established the authority of the Federal project construction agencies to provide for the development of fish and wildlife as an integral part of water resource planning, and it serves to strengthen the authority of these agencies to provide for the enhancement and mitigation of damage to these resources.

While these amendments to the Coordination Act represent a long-desired and welcomed step forward, they are presumed to be more permissive than mandatory and, consequently, are subject to broad and varied interpretation by the construction agency.

Therefore, we are moved to make the following recommendations which we believe are of sufficient importance to warrant their adoption into basic water resource planning and development through a compulsory directive by the Congress.

1. Under the present and somewhat restrictive land acquisition policy, the construction agencies are not permitted to acquire land deemed sufficient and necessary by the fish and wildlife agencies for full and proper development and utilization of the reservoir area potentialities.

Under present land acquisition practices the Bureau of Reclamation acquires land in fee title 300 feet horizontally from the top of irrigation pool. The Corps of Engineers policy is to acquire in fee title that land lying within the 5-year flood frequency elevation.

In light of the need for more land to benefit hunting, fishing, and outdoor recreation, it is recommended that the present policies be revised to permit the corps and the Bureau to acquire land in fee title to the top of flood control pool.

2. A definite unit of water storage should be maintained in the reservoir for the protection of fish and wildlife. It is our viewpoint that drawdown should not be made to that point where fish and wildlife resources are endangered.

Therefore, it is recommended that a fish and wildlife water storage allocation should be included in plans submitted for project authorization. This arrangement would provide and assure a water supply specifically for the management of fish and wildlife and would prevent its loss in the event of extremely high irrigation and water supply demands.

3. In most instances, the impoundment of a water reservoir results in the reduction of stream flow in channel below the dam. This reduction is usually so severe that the channel is no longer capable of sustaining a desirable fish population.

Therefore, an allocation of water for sustained release should be made to protect and maintain stream fishery.

4. In the construction of impoundments, it is often possible to provide and establish small ponds, lakes, and waterfowl marshes which would be managed specifically for wildlife.

Therefore, it is recommended that such subimpoundments be included in reservoir projects.

5. Regrettably, neither the Corps of Engineers nor the Bureau of Reclamation is granted funds for the building of roads for hunting and fishing access. In the absence of roads, it is frequently impossible to fully utilize the fish and wildlife resources at the reservoirs.

Therefore, it is recommended that the Congress provide funds and that construction agencies be directed to build roads to benefit hunters and anglers.

Thank you, Senator Schoeppel. I wish you would express to Senator Kerr my appreciation for his presence here. The Senator and I look down the same gun barrel on this fish and wildlife and recreation, and I think that most of the papers today mentioned fish, wildlife, and recreation and this was just a continuance of it.

Thank you, sir.

Senator SCHOEPPEL. We are glad you could be here, Mr. Leahy, and especially for your important position in our State. We are glad to have your views.

Mr. LEAHY. Thank you, sir.

Senator SCHOEPPEL. The next statement will be concerning water and recreation. The coordinator is Robert Sandifer, park and resources authority.

We are glad indeed to have you here today with us.

STATEMENT OF ROBERT SANDIFER, PRAIRIE VILLAGE, KANS., CHAIRMAN, STATE PARK AND RESOURCES AUTHORITY

Mr. SANDIFER. It is a pleasure to be here, Senator.

Mr. Lynn Burris, who is our director, has prepared the statement. We are mindful of the time limitation that you gentlemen have. It is a long, involved, and delayed program.

We will introduce our statement for the record and read just a few excerpts from it.

Senator SCHOEPPEL. That will be quite all right. Your statement will be made a part of the record.

(The statement referred to follows):

PREPARED STATEMENT BY ROBERT D. SANDIFER, CHAIRMAN, KANSAS STATE PARK AND RESOURCES AUTHORITY

Mr. Chairman, committee members, and gentlemen, my name is Robert D. Sandifer. I serve as chairman of the Kansas Park and Resources Authority. We wish to file for the record our statement. Also, the statements concerning water and recreation of the Governor's recreation advisory council and the Kansas Recreation Society, we wish to file for the record.

The authority, an agency of State government, was created by the 1955 legislature for the purpose of conserving and planning the development of the natural resources of the State and providing for their use and enjoyment. The authority

consists of nine members, five of whom are appointed by the Governor to serve 4-year terms. The remaining four are the Governor, the director of the State highway commission, the chairman of the forestry, fish and game commission, and the director of the Kansas Industrial Development Commission. These members serve an ex officio capacity and have no vote.

We are appearing before this senatorial committee as the official representatives of the Kansas Park Authority, for the purpose of expressing the character of significant recreational problems in Kansas and their relation to the Federal Government, to summarize what is now being done to resolve those problems, and to outline certain items that appear to deserve your consideration.

Contrary to many persons conception Kansas is characterized by varying land forms, of scenic and recreational interest. The surface features range from gently rolling hills to irregular and abrupt land formation countryside, dominated by the expansive plains so often described as being typical of the State, broken here and there by more rugged topographical variations.

Kansas has had a long and colorful history. In the 1500's Spanish explorations had penetrated the northern part of the present State. It has since passed through many eras under several nations, but most of the historical resources now remaining concern its history and growth as related to the United States. The major themes thus represented are the Indian-military frontier period; transportation and communication, including the Pony Express, the Oregon and Santa Fe Trails, with their interesting and historical landmarks; Civil War, mainly covering events leading to that conflict; and the agricultural and political phases. There is close relation between our rivers and streams and the above historic themes of Kansas.

KANSAS PARK PROGRAM

In addition to these natural, cultural, and historical recreation resources, the water control projects of the Kansas River and Arkansas River Federal impoundment programs, and the many State park and lake impoundments have constituted the major recreational development on behalf of this State.

Kanopolis Lake and State Park is now entering its second year of operation and development by the park authority. The program in this area will involve new and improved access and interior roads, modern park and recreational facilities, and constructive management. This management program has been developed, the area has been improved tremendously; exemplifying the—State and Federal—coordination and cooperation that results in the enhancement of the natural resources and contributes to enjoyable and wholesome use by the public.

EFFECTING RECREATIONAL DEVELOPMENT

The ultimate goal of complete recreational development upon Federal resources depends on local, State, and Federal participation, however, several instances of small conflicts of the immediate past will unreasonably restrict participation in the future. While it is not the intent in this statement to present a critical analysis of the Federal participation as related to recent negotiations with the Kansas Park and Resources Authority, but rather the intent of one expressing assurance that Kansas is meeting the recreational development problems of the future on a comprehensive basis—not on a competitive basis.

This is a serious indictment, but consider two recent experiences affecting the State park program at Kanopolis and our preliminary planning at Fall River Reservoirs, respectively:

The one remaining public access area available now is a 320-acre site at Kanapolis Reservoir has an existing concession operation. The Kansas Park and Resources Authority requested the public access area, subject to the lease of the Corps of Engineers and the concessionaire. The first year's development plans accompanied this request along with complete assurances of complying with and upholding the Corps of Engineers' responsibilities connected thereto. Such a request was in the interest of obtaining the percent of revenues now payable to the Corps of Engineers, so that park users small financial support would go directly to the governmental agency involved with development and maintenance.

This public access area was admittedly the most expensive area and the one in which the corps spent the largest share of its maintenance budget. Therefore, since the park and resources authority is willing to assume the financial burden of heavy maintenance costs and in addition thereto intends to place considerable capital improvements, namely the sum of $50,500. The improvements referred

to above consist of a water supply system with distribution lines, a modern toilet facility, a shower and latrine building, five shelterhouses, and other recreational equipment such as tables, grills, boat ramps and parking lots.

In exchange for the assumption of heavy Federal expenditures and the aforementioned capital improvements, the park and resources authority requested the assignment of the concession lease referred to above. This request was denied. The reason stated was no authority on the part of the Government to assign concession leases.

At Fall River Reservoir, lease negotiations for State park development are in the final draft state. Again, an existing concession lease has been removed from the lease of public use areas. In addition thereto a clause in the lease may, depending upon a legal determination, entirely prohibit the park authority from any revenue-producing activity.

Such a provision prohibiting non-Federal constructive development will repress the financial resources to extend necessary and desirable public services on behalf of the State. Extension of these present policies relative to concessions is not compatible with Federal-State cooperation upon federally constructed reservoirs. Such policy inflicts competing operations within the States realm of public use development. And such a policy conflicts with sound planning because the concession and public use development are necessarily dependent one upon the other and must be governored by the same agency.

It is the desire of the authority to resolve this and similar problems directly with the Federal agencies involved. However, in the event a practical solution cannot be obtained immediately, we can only hope for small accomplishments in these areas in the future.

EFFECTING FUTURE DEVELOPMENT

Kansas, along with the other States of the great plains area contains outstanding recreational pursuits, within their resources relating, primarily, to Federal water impoundments projects. It is not necessary to point out to this committee the significance of these impoundments; the increasing recreational interests; the impact it has on business enterprises and its value within our social environment. Such innovations as Mission 66, Operation Outdoors of the national forests, and the National Outdoor Recreational Review Commission—attesting to the congressional attention—are going to facilitate further progress in meeing the recreational pursuits of our people.

However, these innovations have not as yet applied positive action to water resource projects in the Great Plains region; projects that do hold possibilities of great public service if properly handled. Federal-State cooperation, should contribute to proper development recognizing that both levels contain areas of responsibility not conceived in the past, and further evidence of this responsibility will be set out in detail below. Kansas' inability to recognize the States participation heretofore is by no means peculiar to this country, and our expectations for complete future development is underlined by full understanding and cooperation between the Federal and State.

This past year our operations at Kanopolis succeeded in projecting the recreational needs of our visiting public resulting in the setting forth responsible guidelines in phases of planning, land requirements, and basic facilities such as access and interior roads, to assure maximum sustained benefits. We cannot say how effective the guidelines will anticipate future water-related recreation problems. However, there is promise in positive consistent effort to establish a coherent pattern.

PLANNING

The Park and Resources Authority believes that the basic features required in the public access areas upon any Federal reservoir should be: safe and adequate roads and parking, water supply and modern sanitary facilities. The facilities in turn should: provide for the use and initial needs of the public; relate to the terrain in such a manner that the abusing results of public use will be kept to a minimum; and enhance the outstanding values, held in trust, of Kansas' natural and historic heritage.

Planning as related to the above will be a sizable task and represents a demand that far outstrips the action, to date, on the part of Federal, State, and local agencies.

LAND REQUIREMENTS

Just as Kansas nor the Nation cannot afford to waste reservoir sites by not making storage provisions for future water supply, we cannot dissipate public use sites within the project limits and thereby hamper justification of State participation. In several instances access areas, 175 to 250 acres in size, are not adequate to utilize the recreation potential.

Adapting such factors as annual visitation, influent highway routes, and population centers reveal certain areas are more vulnerable to intensive use than others. Private development that takes place next to such areas reduces the enlargement opportunities found, later, to be necessary. And, coupled with this, of course, is the problem of no recourse to obtain adjacent land at the original land-use value.

More conveniently, this State agency could plan and budget accordingly and meet our responsibilities better, if Congress could establish a firm planning and construction schedule at least 3 years in advance as mentioned in an earlier statement presented today.

ACCESS ROADS

The 40-foot right-of-way width on roads leading to public use areas is woefully narrow relating to private development and its physical space relation to the road. Haphazard private development along access roads without benefit of regulatory control of the building codes, zoning ordinances, or planning commissions is a serious threat to safe ingress and egress on any heavily traveled highway. We feel our previous request to the Corps of Engineers, of establishing a minimum of 100- to 120-foot right-of-way for access roads, was based on sound planning.

We call to your attention the access development by the State Highway Commission at Kanopolis Reservoir. Based on the traffic count and relating criteria they presently are planning a connecting road of Kansas Highway No. 141 to the park with a right-of-way width of 120 feet. Their width requirements on right-of-way vary with the terrain, but their shoulder-to-shoulder width is a minimum of 44 feet wherein daily traffic is in excess of 800 cars. In view of the expanding use on behalf of the park users and its bearing upon access road development, we feel the highway commission is setting a precedent to be recognized by all levels of government.

INTERIOR ROADS AND PARKING

Voluntary and trail roads and lack of space to move safely to and from concentrated activity areas are the net result of roads and related features being inadequate. We project the purpose of such roads in this case, to point out certain primary considerations.

First of all roads, as a basic facility and service for public use, make areas accessible, assist the functions of management by preventing the despoilment of recreation and other values, and contribute to the safety of the area user. Equally important and basic are such closely related features as parking areas, guide rails, signs, and guideposts for control. The avoidance of any of these features will impair the function or activity for which the roads serve.

CONCLUSION

In conclusion, let us thank you for this opportunity to present our program for your consideration.

We hope to convince you that we are not espousing the causes set out in the foregoing presentation for petty, selffish reasons but are mindful of the charge with which we are blessed. The great master of all governmental agencies is John Q. Public and we are striving to develop and improve the Federal reservoirs in the most economical and utilitarian manner possible. Over 12½ percent of the persons using the facilities at Kanopolis State Park were from outside the State of Kansas; this park, mind you, is almost in the center of Kansas. Therefore persons all over this Nation are to be served by the parks we hope to develop.

The public is the final yardstick, the final judge of how well we perform our function. However, we request your assistance and consideration over the long and difficult road ahead to the ultimate goal of complete and fully improved Federal reservoirs.

APPENDIX I. CURRENT RESOLUTIONS SUPPORTING STATE PARTICIPATION FOR FEDERALLY DEVELOPED RESERVOIRS

REGARDING RECREATIONAL DEVELOPMENT AT POMONA RESERVOIR

Whereas, Pomona Reservoir as a recreational and tourist attraction, when finished will attract thousands of visitors; whereas, the reservoir is located close to many metropolitan areas and will serve as a major recreation area for many thousands of Kansans from outside this immediate area; whereas, minimum facilities in the various public use areas around the resorvoir cannot possibly accommodate the needs and desires of the multitude of visitors to the resorvoir; whereas, the city of Pomona is in wholehearted support of the activities of the park and resources authority; and, whereas, the city of Pomona deems it necessary to make the earliest possible start on recreational development at Pomona Reservoir in order that facilities be ready as nearly as possible to the time of the opening of the reservoir for public use; the city of Pomona requests the Kansas Park and Resources Authority to begin immediately a feasibility study for one or more major full-scale recreational areas at Pomona Reservoir; that negotiations begin at once to secure from the Federal Government or private landowners an area large enough to accommodate the anticipated needs; that reasonable accurate estimate be made on the funds needed to lease or acquire such lands for the development of same into first-class recreation areas; and that upon completion of these and other studies, the appropriate requests for appropriations be submitted for approval to the Kansas Legislature.

BILL DUSIN, *Mayor of Pomona.*

RESOLUTION REGARDING RECREATIONAL DEVELOPMENT AT POMONA RESERVOIR

Whereas Pomona Reservoir as a recreation and tourist attraction, when finished will attract thousands of visitors; and

Whereas the reservoir is located close to many metropolitan areas and will serve as a major recreation area for many thousands of Kansans from outside this immediate area; and

Whereas minimum facilities in the various public-use areas around the reservoir cannot possibly accomodate the needs and desires of the multitude of visitors to the reservoir; and

Whereas the Lyndon Booster Club is in wholehearted support of the activities of the park and resources authority; and

Whereas the booster club also appreciates the initial explorations already being carried on at Pomona Reservoir by the authority and its director, Mr. Lynn Burris; and

Whereas the booster club deems it necessary to make the earliest possible start on recreational development at Pomona Reservoir in order that facilities be ready as nearly as possible to the time of the opening of the reservoir for public use: Now, therefore, be it

Resolved, That the Lyndon Booster Club requests the Kansas Park and Resources Authority to begin immediately on feasibility studies for one or more major full-scale recreational areas at Pomona Reservoir; that negotiations begin at once to secure from the Federal Government or private landowners an area large enough to accomodate the anticipated needs; that reasonably accurate estimates be made on the funds needed to lease or acquire such lands and for the development of same into first-class recreation areas capable of accomodating overnight or vacation-type visitations; and that upon completion of these and other studies the appropriate requests for appropriations be submitted for approval to the Kansas Legislature.

JACK MILLER,
President, Lyndon Booster Club.
BILL SINGULAR,
Secretary, Lyndon Booster Club.

RESOLUTION REGARDING RECREATIONAL DEVELOPMENT AT POMONA RESERVOIR

Whereas Pomona Reservoir as a recreation and tourist attraction, when finished, will attract thousands of visitors; and

Whereas the reservoir is located close to many metropolitan areas and will serve as a major recreation area for many thousands of Kansans from outside this immediate area; and

Whereas minimum facilities in the various public-use areas around the reservoir cannot possibly accommodate the needs and desires of the multitude of visitors to the reservoir; and

Whereas the Ottawa Chamber of Commerce is in wholehearted support of the activities of the park and resources authority; and

Whereas the chamber of commerce also appreciates the initial explorations already being carried on at Pomona Reservoir by the authority and its director, Mr. Lynn Burris; and

Whereas the chamber of commerce deems it necessary to make the earliest possible start on recreational development at Pomona Reservoir in order that facilities be ready as nearly as possible to the time of the opening of the reservoir for public use; Now, therefore, be it

Resolved, That the Ottawa Chamber of Commerce requests the Kansas Park and Resources Authority to begin immediately on feasibility studies for one or more major full-scale recreational areas at Pomona Reservoir; that negotiations begin at once to secure from the Federal Government or private landowners an area large enough to accommodate the anticipated needs; that reasonably accurate estimates be made on the funds needed to lease or acquire such lands and for the development of same into first-class recreation areas capable of accommodating overnight or vacation-type visitations; and that upon completion of these and other studies the appropriate requests for appropriations be submitted for approval to the Kansas Legislature.

RESOLUTION ADOPTED BY TUTTLE CREEK DEVELOPMENT COMMITTEE—SEPTEMBER 8

Whereas Tuttle Creek Reservoir as a major midwestern tourist attraction, when finished, will attract at least a million visitors a year; and

Whereas the reservoir is located close to many metropolitan areas and will serve as a major recreation area for many thousands of Kansans from outside this immediate area; and

Whereas minimum facilities in the various public-use areas around the reservoir cannot possibly accommodate the needs and desires of the multitude of visitors to the reservoir; and

Whereas the Kansas Park and Resources Authority is the only State agency empowered to construct and operate the type of facilities deemed proper and adequate for such a tourist attraction; and

Whereas the Manhattan Chamber of Commerce is in wholehearted support of the activities of the park and resources authority; and

Whereas the chamber of commerce also appreciates the initial explorations already carried on at Tuttle Creek by the authority and its director, Mr. Lynn Burris; and

Whereas the chamber of commerce deems it necessary to make the earliest possible start on recreational development at Tuttle Creek in order that facilities be ready as nearly as possible to the time of the formal opening of the reservoir for public use: Now, therefore, be it

Resolved, That the Manhattan Chamber of Commerce requests the Kansas Park and Resources Authority to begin immediately on feasibility studies for one or more major full-scale recreational areas at Tuttle Creek Reservoir; that negotiations begin at once to secure from the Federal Government or private landowners an area or areas larger than now contemplated by the Corps of Engineers in its public-use areas; that reasonably accurate estimates be made on the funds needed to lease or acquire such lands and for the development of same into first-class recreation areas capable of accommodating overnight or vacation-type visitations; and that upon completion of these and other studies the appropriate requests for appropriations be submitted for aproval to the Kansas Legislature.

Mr. SANDIFER. My name is Robert Sandifer.

I serve as chairman of the Kansas Park and Resources Authority. We wish to file for the record our statement.

Also, the statements concerning water and recreation of the Governor's recreation advisory council and the Kansas Recreation Society, we wish to file for the record.

The authority, an agency of State government, was created by the 1955 legislature for the purpose of conserving and planning the development of the natural resources of the State and providing for their use and enjoyment.

The authority consists of nine members, five of whom are appointed by the Governor to serve 4-year terms. The remaining four are the Governor, the director of the State highway commission, the chairman of the forestry, fish and game commission, and the director of the Kansas Industrial Development Commission. These members serve in an ex officio capacity and have no vote.

The ultimate goal of complete recreational development upon Federal resources depends on local, State, and Federal participation, however, several instances of small conflicts of the immediate past will unreasonably restrict future participation in the future.

While it is not the intent of this statement to present a critical analysis of the Federal participation as related to recent negotiations with the Kansas Park and Resources Authority, but, rather, the intent of one expressing assurance that Kansas is meeting the recreational development problems of the future on a comprehensive basis, not on a competitive basis.

This is a serious indictment, but consider two recent experiences affecting the State park program at Kanopolis and our preliminary planning at Fall River Reservoirs, respectively.

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Such a request was in the interest of obtaining the percent of revenue now payable to the Corps of Engineers, so that park users small financial support would go directly to the governmental agency involved with development and maintenance.

This public-access area was admittedly the most expensive area and the one in which the corps spent the largest share of its maintenance budget.

Therefore, since the park and resources authority is willing to assume the financial burden of heavy maintenance costs, and, in addition thereto, intends to place considerable capital improvements; namely, the sum of $50,500. The improvements referred to above consist of a water-supply system with distribution lines, a modern toilet facility, a shower and latrine building, five shelter houses, and other recreational equipment such as tables, grills, boat ramps, and parking lots.

In exchange for the assumption of heavy Federal expenditures and the aforementioned capital improvements, the park and resources authority requested the assignment of the concession lease referred to above. This request was denied. The reason stated was no authority on the part of the Government to assign concession leases.

At Fall River Reservoir, lease negotiations for State park development are in the final draft state. Again, an existing concession lease has been removed from the lease of public use areas.

In addition thereto a clause in the lease may, depending upon a legal determination, entirely prohibit the park authority from any revenue-producing activity.

Such a provision prohibiting non-Federal constructive development will repress the financial resources to extend necessary and desirable public services on behalf of the State.

Extension of these present policies relative to concessions is not compatible with Federal-State cooperation upon federally constructed reservoirs.

Such policy inflicts competing operations within the States realm of public use development. And such a policy conflicts with sound planning because the concession and public use development are necessarily dependent one upon the other and must be governed by the same agency.

It is the desire of the authority to resolve this and similar problems directly with the Federal agencies involved.

However, in the event a practical solution cannot be obtained immediately, we can only hope for small accomplishments in these areas in the future.

We feel that these two examples point up the problem that must necessarily be resolved before proper State and Federal participation can be effectively consummated.

Thank you for your time.

Senator SCHOEPPEL. Thank you for your presentation.

I believe the next category is a general statement concerning water in Kansas legislative actions.

Mr. Smith is coordinator, and Mr. Bowers, and Mr. Bower of McLouth, will testify. We are very glad to have you here, Bill.

STATEMENT OF HON. WILLIAM S. BOWERS, CHAIRMAN, WATER RESOURCES COMMITTEE, KANSAS STATE SENATE

Mr. BOWERS. Senator Schoeppel, I am William Bowers, chairman of the Kansas Senate Water Resources Committee. Due to the time limitation I will just file my statement but I did want this committee to know that it is my statement along with that of Mr. John Bower of McLouth who is the chairman of the water resources committee of the Kansas House of Representatives.

Senator SCHOEPPEL. Are you singular or plural?

Mr. BOWERS. I am plural, he is singular.

Senator SCHOEPPEL. You are Bowers and he is Bower?

Mr. BOWERS. That is correct, Senator.

Senator SCHOEPPEL. All right. Go ahead.

Mr. BOWERS. I will not read our statement at this time, but the gist of it is simply that the Kansas Legislature the last few years has taken a very, very positive attitude toward water resources development and our statement points this up and lists certain examples and the steps that the Kansas Legislature has taken.

Thank you.

Senator SCHOEPPEL. Thank you very much.

(The document referred to is as follows:)

STATEMENT PRESENTED BY WILLIAM S. BOWERS, CHAIRMAN, WATER RESOURCES COMMITTEE, KANSAS STATE SENATE, AND JOHN D. BOWER, CHAIRMAN, WATER RESOURCES COMMITTEE, KANSAS STATE HOUSE OF REPRESENTATIVES

Mr. Chairman and gentlemen, the undersigned serve as chairmen of the water resources committee of the Kansas State Senate and the water resources committee of the Kansas State House of Representatives. We are particularly pleased that your committee has chosen to hold one of its hearings in the State of Kansas, and we are sure that on the basis of the testimony you have heard today, you recognize that water is a most vital subject in Kansas. Certainly the United States in establishing your committee has initiated an important and worthwhile assignment. We believe your committee can make a major contribution, and we know that you will do everything within your power to present to the Senate and the Congress an accurate evaluation of the water needs of the country.

Our purpose here today is one of noting that many of the questions and problems to which your attention is being invited are of continuing interest to State legislative bodies and, in this particular instance, the Kansas Legislature. We particularly want you to know that in recent years the Kansas Legislature has been giving continually increasing attention to the water problems of this State as witness some of the following recent actions.

(1) In 1955, the Kansas Legislature created the water resources board and gave it a primary responsibility of working out water resources development plans for this State.

(2) In recent years the legislature has seen cause to accelerate State programs in various basic data collection and research fields as they pertain to water, and it is continuing to give these very important subjects its considered attention.

(3) In 1953, prior to the passage of the national Hope-Aiken legislation, the legislature passed legislation providing for the creation of watershed districts.

(4) In 1957, the legislature undertook a major study of the Kansas laws governing the development and beneficial use of the waters of this State. Major amendments were made to the 1945 Appropriation Act and although additional amendatory legislation will undoubtedly be needed in the future, it is the general belief that by this legislation the State has established a sound legal basis for the granting and administration of water rights.

(5) In 1957, it was the decision of the legislature that a constitutional amendment which would permit possible State participation in water resource development and flood control projects should be one of the proposals placed before the electorate in the general election of 1958. It may be of interest to know that only three such proposed amendments may be submitted to the electorate at any general election, and the water amendment was the first to be approved by the legislature out of some 20 proposed amendments which were introduced for legislative consideration in 1957. It will also be of interest to learn that this amendment was overwhelmingly approved in the 1958 election. At some future date, the legislature undoubtedly will be called upon to give consideration to possible ways and means of implementing the authority granted under the amendment.

(6) There are attached hereto copies of concurrent resolutions passed by the 1959 session of the legislature, which will undoubtedly be of interest to you. The first resolution acknowledges the tremendous contribution that the many Federal programs make to water resources development in this State, and respectfully requests the Congress to give continued favorable consideration to these programs. The second resolution deals with the problems of State-Federal relationships and respectfully requests that the Congress clarify any doubts that might arise as to the validity of State water rights as they may be affected by Federal activities.

The aforementioned are but a few illustrations of the intense legislative interest in water problems that exists here in Kansas. We trust that the items cited above are sufficient to show that this interest is current, vigorous, and of a continuing nature.

In closing we would point out that whereas the results of your deliberations will provide a guide for future congressional consideration of the Nation's water needs, they can be expected to be of equal assistance to legislative bodies across the Nation. As we continue to study the problems of programing the necessary State responsibilities and providing adequate local enabling legislation, it is necessary that we have a clear understanding of Federal policy and how it relates to non-Federal considerations. You may be assured that the results of your studies will be of particular interest to the members of the Kansas Legislature.

Respectfully submitted.

WILLIAM S. BOWERS.
JOHN D. BOWER.

HOUSE CONCURRENT RESOLUTION 20

A concurrent resolution petitioning the Congress of the United States to take appropriate action to assure the continuance of surveys and planning and cooperation in the construction of projects in the State of Kansas that are vital and necessary to the control of floods and the conservation of soil and water by sufficient appropriations being granted for this purpose to the Bureau of Reclamation, the U.S. Department of Agriculture, and the Corps of Engineers and other Federal agencies and departments.

Whereas water and soil are the most valuable natural resources of Kansas; and

Whereas the citizens, industries, farms, and cities of Kansas have always been subject to flood and drought but more recently they have experienced severe hardships and great financial losses from floods and droughts during the years 1951, 1952, 1953, 1954, 1955, 1956, 1957, and 1958; and

Whereas, many cities, industries, and farms have recently suffered from a critical shortage of water and at the same time are exposed to the further hazards of flood and drought; and

Whereas the nature of rivers is such that storms occurring in headwater regions of a stream in one State frequently inflict damage to areas in other States, and the benefits of stream stabilization resulting in adequate and dependable water supplies in one State become beneficial to areas in other States; and

Whereas it has become evident that we must use every means available and feasible to conserve and control all of the sources of water supply for agricultural, municipal, industrial, and recreational use; and

Whereas land treatment and watershed development have been increasingly emphasized as vital to all programs for the conservation of water and soil by the executive and legislative branches of State government, the State water resources board, State department of agriculture and other agencies, and the program is lagging because of the insufficiency of Federal funds for planning purposes; and

Whereas the Federal Government through acts of Congress has delegated to three agencies, namely, the Bureau of Reclamation, the Soil Conservation Service of the U.S. Department of Agriculture, and the Corps of Engineers the principal responsibilities for the conservation of water and soil, and more specifically, such matters as water supply, irrigation, pollution control, soil conservation, and flood control: Now, therefore, be it

Resolved by the House of Representatives of the State of Kansas (the Senate concurring therein), That we respectfully urge, request, and petition the Congress of the United States to take such action necessary to assure (1) continuance of surveys, planning, and cooperation in the construction of projects in the State of Kansas that are vital and necessary to the prevention of floods and to the conservation of water and soil, and (2) that Federal funds for this purpose be appropriated in sufficient amounts to the Soil Conservation Service of the U.S. Department of Agriculture, the Bureau of Reclamation, and the Corps of Engineers, and also other Federal agencies and departments; and be it further

Resolved, That the secretary of state be instructed to transmit enrolled copies of this resolution to the President of the United States, the Vice President of the United States, each Member of Congress of the United States, and the Director of the Bureau of the Budget of the United States.

Adopted February 27, 1959.

HOUSE CONCURRENT RESOLUTION 31

A concurrent resolution memorializing the Congress and the President of the United States to safeguard and preserve established State and individual rights to the use of water within the separate States.

Whereas, despite repeated congressional recognition in many statutes such as the Federal Power Act, and the Water Supply Act of 1958, that the States have and should have the primary interest, a series of judicial decisions in the last decade and a half has undermined the ability of the States to perform their appropriate tasks in this field and has suggested the possibility of unlimited Federal prerogatives concerning water which cast doubt on the basis of vested rights and weakens the ability of the States successfully to coordinate water use; and

Whereas recent opinions and assertions from the U.S. Department of Justice would deprive States and persons of rights which said States and persons previously enjoyed, to regulate and control the use of water in those respective States; and

Whereas said decisions of the Federal courts and opinions and assertions of the U.S. Department of Justice are further a part of a general pattern developing gradually into Federal supremacy and usurpation over water, which, if continued, will destroy individual and States rights over water, and substitute in lieu thereof an all-powerful centralized government control thereover; and

Whereas Kansas and the numerous Federal agencies do now and have always enjoyed a spirit of cooperation in the development of flood control and water resources programs and it is the wish of the people of Kansas that such interest and cooperation be preserved and continue in the future; and

Whereas factors involved in water use development are peculiarly dependent on local geography, climate, and economic needs and are consequently best handled within our Federal system by the State level of government; and

Whereas the traditional role of the States in the administration, conservation, and utilization of their water resources has led in the direction of optimum harmonious development of these water resources; and

Whereas Federal agencies which have complied with State water law in obedience to the expressed intent of Congress have not jeopardized any of the legitimate interests of the Federal Government; and

Whereas, doubts raised by these judicial decisions and Department of Justice opinions as to the basis of vested water rights, present and future, and doubts as to the relationships between the Federal and State Government will, without corrective congressional action, tend to delay much needed water development for an indefinite time and discourage the States in their efforts to make much needed improvements in their facilities for water resources planning and development: Now, therefore, be it

Resolved by the House of Representatives of the State of Kansas, the Senate concurring therein, That the Congress and President of the United States and the representatives of Kansas in the Congress of the United States be, and they are hereby, respectfully urged and requested to take all necessary action to (1) preserve the water rights of the individual and the States and to prevent Federal usurpation of those rights; (2) to see that legislation is initiated and supported to reestablish to the individuals and to the States the rights taken from them by the Federal courts and the Justice Department; and (3) in every possible way reaffirm, renew, and defend the concepts that water rights are property rights and that these established rights to the use of water, by a State or an individual, should not be taken away without due process of law and adequate compensation: Be it further

Resolved, That the secretary of state be instructed to transmit enrolled copies of this resolution to the President and Vice President of the United States; to the Speaker of the House of Representatives of the Congress; to the chairman of the U.S. Senate and House Committees of Interior and Insular Affairs; to U.S. Senator Andrew F. Schoeppel; to U.S. Senator Frank Carlson; and to U.S. Representatives William Avery, Newell George, Denver Hargis, Ed Rees, Floyd Breeding, and Wint Smith.

Adopted Mach 21, 1959.

Senator SCHOEPPEL. We have here the next statement, in the general statements concerning water.

Mrs. James E. Seaver, of Lawrence, Kans., president of the League of Women Voters of Kansas.

Mrs. Seaver, we are delighted to have you here and folks that you represent. We are especially interested and delighted in your interest in this overall program that is being presented here not only in our State of Kansas in this committee but in a lot of these other States, to wrestle with it later on when we get these hearings all over with.

STATEMENT OF MRS. JAMES E. SEAVER, PRESIDENT OF THE LEAGUE OF WOMEN VOTERS OF KANSAS

Mrs. SEAVER. Thank you, Senator Schoeppel.

Ladies and gentlemen, I am Mrs. James E. Seaver, president of the League of Women Voters of Kansas, which is an integral part of the League of Women Voters of the United States. The league has more than 126,000 members in more than 1,000 local leagues in all 50 States and the District of Columbia.

There are 15 local leagues in Kansas with about 1,500 members. The league is a politically nonpartisan organization which works only in the field of government. Its purpose is to promote political responsibility through informed and active participation of citizens in government.

The League of Women Voters of Kansas has given sustained attention to soil and water conservation continuously since 1952 with emphasis on water rights legislation, watershed districts, Federal water and soil conservation projects in Kansas, and proposals to develop river basins for the beneficial use of water.

The Kansas league supported the Watershed Districts Act of 1953 which made it possible for people within a watershed to organize themselves into a district for soil and water conservation.

In 1955 support was given by the Kansas League to the bill which created the State water resources board and supported the revision of the Watershed Districts Act to facilitate and accelerate the organization of watershed districts.

In 1957 the Kansas league watched with interest and approval changes made in the Water Appropriations Act as proposed by the water resources board to clarify and define provisions in the original law passed in 1945.

Since 1956 a water resources item has been on our national program. The item as adopted by the 1958 convention is worded "Water resources: Support of those national water policies and practices which promote coordinated administration, equitable financing, and regional or river basis planning."

The League of Women Voters of Kansas, recognizing that water is so basic a resource to all of man's activities, finds it strange that no specific Government agency has been assigned the responsibility of overseeing its conservation and use. Increased use of water in our way of living and expected increases in our country's population are making it necessary for our Government to establish some policies and plans for our water resources.

Kansas shares in the general needs and problems that step from increases in water use and in population. Our most serious problem, however, is the storage of water in times of plentiful or overabundant rainfall to provide for prolonged periods of insufficient rainfall.

It has been estimated that our losses from droughts far exceed losses from floods. Water shortage problems in Kansas also stem from the

fact that most of the State has a poor supply of underground water, poor both in amount and in quality because of a high content of mineral salts.

Since water is distributed unequally both as to time and to place, it is vital to have a continuous water policy relating to the entire country. At present planning and promoting projects for specific purposes jeopardize future water needs.

An overall national policy is important to provide sufficient water supply for all our people and to protect the people from too much water. The interdependence of States upon common supplies necessitates a national policy administered regionally.

Up to now, the United States has had no national water resources policy. Water resources development has been approached on the basis of specific problems or development for specific purposes; for example, projects which have been built primarily for flood control or irrigation have had multiple purposes merely built in, often largely to achieve the necessary benefit-cost ratios.

The public has seldom been presented with a comprehensive plan for any river basis, or a choice of plans showing what the public moneys would buy under various combinations of approaches to water control.

We believe more uniform criteria for evaluation should be developed. This could be done if executive and congressional procedures were revised so that alternative plans could be considered and that plan authorized which would best serve the area regardless of which agency might be promoting its adoption.

A central coordinator agency charged with the development of integrated planning for our water resources could also explore all possible approaches to the control of water. Comprehensive plans should take into consideration all needs and desired uses. These could encompass a variety of engineering structures from the uplands to the main stream, combining such features as levees and stabilization works. A central coordinating agency could determine standards and rules concerning the financing of water development costs. Conflicts of interest and the seeking of funds by competing departments and agencies, which have led to haphazard and piecemeal planning in the past, might be avoided.

We believe that so far as beneficiaries can be determined, they should be held responsible for their fair share of costs. Water belongs to everyone, and it should be allotted in quantities that are necessary at a cost that is fair to all. One of the effects of the greater cost sharing should be closer scrutiny by the public of proposed plans before the promotion of public expenditures for projects.

The Federal Water Pollution Act (Public Law 660) is an example of what we, the Kansas league, mean when we urge equitable financing. Local initiative has been encouraged by the Federal grants of moneys that make possible the development of projects which otherwise put a financial strain on local areas.

The incentive offered by these grants has been a stimulus to attack the pollution problem in the Nation's rivers. In this case, it is in the total national interest that our water supply not be polluted. The Nation as a whole, therefore, may well be considered a partial beneficiary of these projects.

The league believes that water development in the public interest can be achieved through planning on a regional or river basin level. Plans developed for individual river basins will need to be coordinated with plans for other basins. A central coordinating agency doing this would take into account the interest of the country as a whole.

Senate bill 2549, entitled "The Resources and Conservation Act of 1960," inspires us with the hope that we will have the beginning of a national policy for water resources. This act would, we feel, aid in the development of such a policy. The League of Women Voters of the United States and the League of Women Voters of the State of Kansas will support this measure.

We would further like to commend the Senate upon the establishment of this select committee and to congratulate the committee for its work.

We appreciate the opportunity of appearing before you today.

Attached to this statement is a river basin study of south-central Kansas which was prepared by the Wichita League of Women Voters and this is typical of the projects which have been carried on in this area of our study.

Senator SCHOEPPEL. Thank you, Mrs. Seaver. That will all be made a part of the file.

Next, Mr. E. C. Reed, Nebraska Soil and Water Conservation Committee.

Mr. DEWEY. Senator, we understand they could not make it. I have a statement here if I may, sir.

Senator SCHOEPPEL. Yes.

Mr. DEWEY. Filed for the record by the Kansas section of the American Society of Civil Engineers, and the Kansas Engineering Society has requested the hearing be held open and they would like to file a statement at a later date if that would be permissible, sir.

Senator SCHOEPPEL. If you mail them to me I will see they get into the record and become a part of the record of these hearings.

Mr. DEWEY. All right. Thank you.

(The statement referred to follows:)

STATEMENT OF C. FRANK VIRR, PRESIDENT OF THE KANSAS SECTION, AMERICAN SOCIETY OF CIVIL ENGINEERS

Mr. Chairman, Senator Schoeppel, members of the Select Committee on National Water Resources of the U.S. Senate, the Kansas section of the American Society of Civil Engineers represents a professional engineering body of 386 members practicing in this great State of Kansas. A number of these members are making statements representing many State, municipal, and other organizations before this committee today. The many members are vitally interested in water resources and a large group of members of the society have devoted their lives to effort and study in meeting the tremendous challenge of our age exemplified in the search for means of controlling, purifying, maintaining, and utilizing nature's basic product, water.

The interest of the Kansas section, ASCE, in the work you are carrying on is overshadowed only by the great satisfaction it feels in the fact that you are preparing to report out a coordinated overall program for water resources.

As a result of the vital need for a national water resource policy and the proximity of the civil engineering profession to that need and its problems, the Kansas section of the American Society of Civil Engineers, in regular meeting assembled on November 16, 1959, in Topeka, Kans., unanimously passed the following resolution:

"Whereas the Select Committee on National Water Resources of the U.S. Senate is holding public hearings in Topeka, Kans., on the 18th day of November 1959; and

"Whereas the members of the Kansas section of the American Society of Civil Engineers are vitally interested in and will be in a large part called upon to carry to fruition any program developed on this subject as to its application in the State of Kansas; and

"Whereas the Engineer's Joint Council, a combination of all of the major engineering societies of which the American Society of Civil Engineers is a member society, did in 1951 subsequent to the lengthy effort of a large and extremely capable special committee issue a report entitled 'Principles of a Sound National Water Policy'; and

"Whereas said special committee report represents the sound engineering policies of the greatest combined engineering talent ever assembled upon this subject: Now, therefore, be it

"*Resolved*, That the Kansas section of the American Society of Civil Engineers does hereby unanimously affirm its dedication to and belief in the principles contained in the Engineer's Joint Council report entitled 'Principles of a Sound National Water Policy' dated 1951 as applicable to today's national water resource problem and does herewith include said report as part and parcel of this resolution as if it appeared entirely herein and does commend it to the Select Committee on National Water Resources of the U.S. Senate."

Mr. Chairman, we thank you for the opportunity to appear here today and extend our special thanks to the able senior Senator from Kansas, the Honorable Andrew F. Schoeppel, for his personal invitation to appear.

Mr. DEWEY. Everett Barr could not make it, either; and Major Hagar. I understand that he could not be here. Am I correct?

Mr. HAGAR. No.

Mr. DEWEY. Excuse me.

STATEMENT OF MAJ. C. HAGAR, BLACKWATER-LAMINE FLOOD CONTROL ASSOCIATION, SEDALIA, MO.

Mr. HAGAR. Mr. Chairman, I have filed a statement a while ago, but as a lone representative of central Missouri, I would say we have two problems there in those two statements—one, of flood problem of which we are trying to solve, and another is a water supply problem which we hope to solve in the city of Sedalia through board of public works. It is the first city in the State of Missouri that has taken advantage of Public Law 85–5–500, title 3, in which we have requested to purchase storage in a Government structure reservoir.

I thank you for the opportunity of mentioning it.

Senator SCHOEPPEL. Thank you, Major.

Is Joe Liery here? Does anybody know whether he submitted a statement?

I want to say are there any other individuals here now or interested persons who want to file statements? If there are, if you will get them to me, we will see they are filed.

Senator Kerr, I will turn this meeting back to you, sir, with the saying that we appreciate your setting us in the series of these various State hearings and we hope that when we complete this entire record that it will contribute greatly to the entire situation that we are trying to so carefully analyze and look into for definite information for our legislative approach.

Senator KERR. Thank you, Senator Schoeppel; and I want to thank the witnesses who have come here. I want to congratulate the Senator and those who arranged this series of statements. This is one of the most comprehensive and one of the best prepared hearings that we have had the opportunity to conduct or participate in and will make a valuable contribution to the work of this committee.

I appreciate the fact that the League of Women Voters have sent me a copy of their paper on south central Kansas.

I will say this, Senator Schoeppel, that at every hearing that we have had we have had a very interesting and very intelligent statement and testimony from the League of Women Voters. They are one of the most active organizations in our country on the development of water resources, and I want to congratulate those here in Kansas on their participation in this work.

Senator SCHOEPPEL. Senator, I want to say that we were very happy to have here our representatives of the Kansas League of Women Voters who appeared here along with the others at these other States for the benefit of this record.

Senator KERR. That closes the hearings for Topeka.

(Whereupon, at 3:30 p.m., the hearing was concluded.)

(Subsequent to the close of the hearing, the following statements and letters were received for the record:)

THE NEBRASKA ASSOCIATION OF SOIL AND WATER CONSERVATION DISTRICTS,
Liberty, Nebr., November 24, 1959.

Senator ROBERT S. KERR,
Chairman, Select Committee on National Water Resources,
U.S. Senate, Washington, D.C.

DEAR SENATOR KERR: On behalf of the Nebraska Association of Soil and Water Conservation Districts, I am very pleased to forward the following information on the water resources of Nebraska for the review of your committee. I regret that I was unable to present this material to your committee. Originally, I had made plans to submit this report at the hearings in Topeka, Kans. However, later I was informed that only Kansas representatives would be given an opportunity to make this presentation.

The State of Nebraska has widely diverse soil and water management problems. Since we are primarily an agricultural State, the economy of our State is dependent to a large percent on how well we manage our two basic natural resources—soil and water.

In the eastern part of the State, the major problems are concerned chiefly with the control of surface runoff water to (*a*) prevent soil losses from pastures and cropland; (*b*) reduce sedimentation of downstream areas (channels, reservoirs, etc.); (*c*) reduce the damages caused by flooding; and (*d*) manage those runoff waters for municipal, industrial, recreational, and wildlife purposes. Technical assistance (Soil Conservation Service technicians) and ACP cost sharing available in our soil and water conservation districts has done much to solve the above-named problems. However, the conservation program is just getting a good start in Nebraska. The advent of the small watershed program, Public Law 566, gives promise of assisting the local soil and water conservation districts in solving some of the above-named problems. The watershed program appears to hold considerable promise in such areas as the Blue River Basin; Nemaha Valley, Papio Creek, Elkhorn Valley, etc. However, a bottleneck in the watershed program has developed in watershed planning. Additional assistance in planning is needed. Also certain Federal planning criteria is making it impossible for certain needed projects to be eligible for Public Law 566 assistance.

Toward the central part of the State, however, lower average rainfall and more frequent drough periods make it necessary to consider, in addition to those prevalent in the eastern part of the State, the necessity of water conservation on cropland and rangeland. It is in this area considerable deep well and ditch irrigation has developed. Irrigation is used in many areas as a supplement to the rainfall. Proper irrigation water management and the conservation (wise and efficient utilization) of our underground water resources is a problem. We are becoming increasingly concerned in a few areas of the apparent depletion of our underground water resource. The Sandhills of Nebraska are located in this area. Proper range management is important here to conserve moisture, increase soil cover and prevent wind erosion.

The problems enumerated above increases in intensity toward the western end of the State. Recurring series of drought years tend to disrupt the economy of that area by reducing range feed and stock water. Also crop failures cause distress to farmers, ranchers, and townspeople. Moisture conservation is becoming increasingly important in Nebraska as you travel west. Terraces, contour stripcropping, stubble mulch, range management, irrigation bench leveling, lined irrigation ditches, and other irrigation practices are being applied at an accelerated rate to conserve all available moisture.

The recently enacted Great Plains conservation program has already proven to be a practical approach to many of the soil-moisture problems in central and western Nebraska. This program achieves planned conservation on an entire farm or ranch unit. Through this program we believe that it will be possible to stabilize not only the soil and water resources, but also the economy of the area through needed land conversion. Many acres of marginal cropland are being reseeded and converted to rangeland.

Protection of water, soil, and human resources is of high priority in the State, and new and improved technical methods are needed for substained productive farming and ranching suitable to the various conditions within the State of Nebraska. The efficiency of conversion of water and of sunlight energy into food and fiber on our dryland farms and on our rangelands is much lower than it need be. Research has recently indicated it may be possible to greatly increase the efficiency of water use on agricultural lands. If so, the water saved could amount to many times the water now stored within existing reservoirs within the State. The costs of doing such research would be much less than the cost for major storage and control facilities. For this reason, we believe that agricultural research devoted to improving the efficiency of water use and the conservation of our soils is of prime importance to the economy of the State and of the entire country.

Research funds are needed to provide knowledge and methodology for achieving efficient water and soil resource utilization. The following are resolutions on soil and water research that were adopted by supervisors at the 19th annual convention of the Nebraska Association of Soil and Water Conservation Districts which was held in Scottsbluff, Nebr., on October 4, 5, and 6, 1959.

1. Conservation of soil moisture by reducing evaporation and increasing intake.
2. Depletion and recharge of ground water resources.
3. Improved methods for the control of water erosion, especially in eastern Nebraska.
4. Improved methods for control of wind erosion, especially in western Nebraska.
5. Evaluation of effectiveness of the watershed approach in conservation of soil and water, and in reducing flood hazards.
6. Land-shaping practices and structures for soil and water conservation such as bench leveling for irrigation, conservation benches, terraces (design and spacing), earthfilled dams, and gully stabilization.
7. Management of ranges and pastures to give maximum sustained production and to control wind and water erosion.
8. Development of new grass and forage varieties for use in conservation systems and to meet specific conservation needs.
9. The nature of drought resistance and the development of new crops or crop varieties especially for central and western Nebraska.
10. Efficient utilization of irrigation water including methods of application, drainage, prevention of the development of saline and alkali conditions, cropping systems, and fertilization practices.
11. Irrigation-well development in relation to different kinds of water-bearing formations.
12. Quality of water for irrigation purposes and the reclamation of saline and alkali soils.
13. Field windbreaks for modifying the environment and influencing crop yields, including an evaluation of artificial barriers, windbreak design, the development of various species and improved tree varieties for this use, establishment, management, and pest control.
14. Development of equipment to adequately farm land which has been terraced, benched, or otherwise managed to control wind and water erosion.
15. The role of micro-organisms in soil structure, organic matter decomposition, and plant nutrient availability and techniques involved in more effective utilization of micro-organisms.

16. Evaluation of costs and benefits to farmer, consumers, and governmental subdivisions in development and application of each conservation practice.

We feel that, if research is to do its share in providing means of more efficient soil and water resource conservation and utilization, very substantial increases in funds for facilities, personnel, and research operations are needed. Beyond increasing research funds in the State at such locations as Lincoln, Mitchell, North Platte, and Hastings, the moisture conservation research laboratory recommended by the Great Plains Council is needed badly to provide to the farmers of the 10 Great Plains States the knowledge and methodology necessary to increase the efficiency of soil-stored water.

Last year, the Secretary of Agriculture held a series of hearings over the Nation to determine the needs for increased facilities to do research on soil and water problems. The summary of these studies now has been made available in a document known as Senate Document No. 59 of the last session of the 86th Congress and is entitled "Facility Needs and Soil and Water Conservation Research." This document, as printed, provides for the establishment of adequate facilities to do research on these important problems. In view of the increasing importance of wisely conserving and utilizing our water resources, as well as our soil resources, we recommend that Senate Document No. 59 and the request of the Association of Land-Grant Colleges for soil and water conservation research funds should be given full consideration in the forthcoming Congress.

We members of the Soil Conservation District Association of Nebraska give our full support to the implementation of research in soil and water conservation and submit this combined opinion of the representatives of the association as a part of our presentation at the public hearing on water resources.

Yours truly,

EVERETT BARR,
Secretary and Director.

STATEMENT OF M. H. DEKAT, PRESIDENT, ROCK CREEK WATERSHED ASSOCIATION, POTTAWATOMIE COUNTY, KANS.

We, the undersigned officers of the Rock Creek Watershed Association, Pottawatomie County, Kans., do hereby endorse and advocate the watershed program as the only practical, long-range solution to the problems of flood and drought, the greatest problems of the Kansas farmer, because:

1. Through land treatment practices such as terraces, contour farming, waterways, farm ponds and the like, the water is held where it falls.
2. When the water is held where it falls, this means that—

(*a*) There will always be water in the soil for pasture and crops.
(*b*) There will be water in the wells.
(*c*) The soil will not be washed down into the creeks and rivers.
(*d*) There will be no floods on farms or in the cities.

3. The watershed method is based upon soil and water conservation, the only hope for the future of our country because it insures the future of our Nation against the loss of its most necessary and indispensable natural resource, namely, the soil.
4. To do everything within our power to promote the soil and water conservation program is a patriotic duty of ours toward the future of our country, as is illustrated in some remarks of great patriots of the past. Theodore Roosevelt wrote:

"When the soil is gone, men must go, and the process does not take long."

William Jennings Bryan said:

"Burn down your cities and they will rise again as if by magic. But destroy our farms and the grass will grow on the streets of every city in the land."

STATEMENT OF R. W. PACKER, HUGOTON, KANS.

While our topsoil is blowing and washing away, for lack of funds and promotion for true conservation, and thousands of farmers are going broke because of depressed prices, caused by a huge surplus, the Federal Government is spending millions of dollars and manhours putting more land under irrigation, public and private, causing extreme depletion of the soil and underground water in some areas, and creating more surplus.

In many areas that underground water will never be replaced and the soil will be so depleted and deteriorated it will be unfit for dryland farming after the water is gone, in many dry areas, causing untold hardship on future generations.

Whereas the purpose of the farm program is to reduce the surplus and conserve soil and water for the future;

Whereas, while the dryland farmer is told to produce less, millions of dollars are being spent for more irrigation, putting desert land under irrigation at tremendous cost, loans for deep well irrigation, payments for (so-called) conservation practices, and free technical service, so the irrigator can increase his rate of depletion and production many times.

A poor way to reduce the surplus and conserve soil and water for the future to say the least.

Whereas most of the civilizations that have rose and fell, died from within, they lived only for the present and gave no thought to the future generations.

Spending money our great grandchildren will be trying to earn, for more extreme depletion of our soil and underground water that will be desperately needed by those same great grandchildren, to grow more surplus, is the most direct road to ruin, for this or any other nation: Therefore, be it

Resolved, For the future of our country, and the present and future generations, it is urgently recommended there be no more payments, loans, promotion or development of more irrigation until more production of food is needed to feed our increasing population.

Abundant soil and underground water made this country rich, the loss of either one or both, will make it poor.

STATEMENT OF CLARENCE E. HENKEL, SECRETARY OF THE LITTLE BLUE FLOOD CONTROL AND IRRIGATION ASSOCIATION, KANSAS RIVER BASIN, MISSOURI RIVER PROJECT

Upper watershed reclamation projects offer the American people some of the best bargains in water resource development. The public at large and the promoters of water control legislation are becoming increasingly aware that such multiple-purpose projects carry a repayment feature on floodwater diverted to useful purposes. Emphasizing the use of these developments in current planning would allow many millions of dollars to be cut from the overall Federal budget in years ahead.

Several basic economies would result from such procedure. We wish to point out first the important savings from desilting rivers tributary to the mainstems which have cost the taxpayers so much money for channel and levee maintenance. Likewise proper emphasis here would slow the development of dangerous elevated river channels, which are an undesirable side result of leveeing streams bearing excessive silt. Thus, Federal policy speeding flood control in the upper watersheds, would have the effect of decreasing need for subsequent nonrepayable Federal river maintenance investments. While benefiting all areas, such planning in river development would greatly increase the supply potential and cleanliness of water for navigation and public use in the lower watershed area.

As an example of orderly development for the Kansas-Missouri Basin, we believe upstream projects such as that on the Little Blue in Nebraska should be expedited. Here is a proposed Bureau of Reclamation project which will cut down on siltation from a stream which in flood stage has transported much damaging sediment into the lower river system. It will use floodwater to reduce the unit production cost for farmers who will in turn repay a share of the project investment. Not one acre of new or unsettled land will be brought into production through irrigation. With these characteristics it seems likely that the Little Blue project could form the pattern for more economy in the Nation's immediate water control investment.

Projecting this pattern on the general scene, the history of China's Yellow River has demonstrated to the world for all time the danger of disregarding the upper watershed in applying flood control measures. Disastrous floods in that area were the result of silt elevating the channel of a great river above the surrounding countryside. This situation was made possible at great expense by application of general mainstem leeves in advance of upper watershed treatment

Since we have concern for the safety of Americans along the entire course of the river, we feel that this mistake out of the past must not be duplicated in America.

The enclosed letter expressing my view was widely circulated to the Congress.

GLADSTONE, NEBR., *May 29, 1959.*

Hon. STUART SYMINGTON,
Senate Office Building,
Washington, D.C.

MY DEAR SENATOR SYMINGTON: Since you are vitally interested in the preservation and improvement of channels and levees on the inland rivers of America, I am writing to solicit your support for the Little Blue unit of the Kansas Basin division, Missouri River project.

Flood silt has been transported regularly from the farms and riverbanks of the upper watershed and many tons find their resting place in the important navigable waterways of the Missouri and Mississippi. It has been estimated by Mr. R. H. Musser, quoted in the New Republic magazine, July 30, 1951, that the minor flood of 1947 in the Kansas Basin carried in excess of 162,000 acre-feet of silt.

The final product of this developing situation can be noted on the lower Mississippi, Rio Grande, and the Sacramento Rivers, all of which are running above the level of adjacent valleys. Such a trend long continued and coupled with necessary levee buildup will at great expense produce many elevated river channels, dangerous and traditionally fearsome, like the Yellow River in China.

The Little Blue now running at flood stage has been contributing its share to the silting riverbeds of mid-America. Editor B. Long of the Hebron (Nebr.) Journal-Register described the situation on May 13, 1959, when he said, "Part of the time you wonder if it's flowing water or just sliding mud." Considering the inevitable result of this situation, a few well-placed words of support for the Little Blue project and for similar upstream dams may be worth many hard battles fought for channel and levee appropriations.

Your attention is called to a warranted $150,000 request for increased Little Blue planning funds now before the House and Senate Appropriations Committees. Your help is invited in bringing these facts emphatically to the attention of those committees and to the attention of the Secretary of Interior. We believe that speedy development of the Little Blue will produce savings in levee and channel maintenance welcome to the American taxpayer.

STATEMENT OF KANSAS STATE FEDERATION OF LABOR, AFL–CIO

Hon. Chairman Senator Kerr and members of the select committee, the Kansas State Federation of Labor AFL–CIO is delighted to have an opportunity to express our views on water resources, flood control, and water conservation. We have consistently advocated the importance of maintaining an adequate supply of water, harnessing the flow of water, and preventing disastrous floods.

Water is an important factor in maintaining our present industry and attracting new industry to Kansas. Water is used by most industry in the course of their production. It plays a major part in making adequate power available, and of course is absolutely necessary in our homelife.

Industry, in seeking a suitable location, is concerned with the available supply of water for their employees, for production, and recreation.

We see the need for an increase in the number of State and county lakes that will serve three purposes:

1. Conserve our water supply.
2. Provide recreational facilities for the citizens of Kansas.
3. Conserve the fertile soil of our State.

We also believe that large dams are necessary to conserve and maintain an adequate supply of water for industry, the communities and irrigation. The large dams can also play a major part in the elimination of damaging floods.

An adequate water supply through proper storage facilities can serve as a guarantee against searing droughts and disastrous floods.

The State of Kansas, with an ample supply of water and reasonable control of the water runoff during rainy seasons, offers a very favorable location for new industries. The many natural resources make it attractive for the location of various types of industries.

The wholesome labor supply that we have is also an inducement to industry to favorably consider Kansas. Kansas has good transportation facilities and plenty of power.

The future economy of the State, however, rests upon the water resources. We also have many communities that have been in distress, and some are still in distress, because of a shortage of water for industrial use and particularly for home consumption. You no doubt will hear from several communities in Kansas with a particular water problem and the Kansas AFL–CIO is concerned with each and every one of these situations.

The State can, in a limited way, offer some relief, but we feel that the U.S. Congress will have to lead the way. We recognize that the U.S. Congress must consider all of the 50 States in their legislative measures, but we hope that the group appearing before this committee will give you a thorough and descriptive picture of the water problems in Kansas. We have confidence that this committee will look favorably upon helping Kansas develop an adequate water resources program.

Thank you for your attention.

STATEMENT OF THE BUTLER COUNTY, KANSAS, FARM BUREAU

What are the future water needs of Kansas farmers? We can get a fair estimate by looking at some recent Kansas history on this subject. In the last 20 years droughts have cost Kansas annual losses totaling $75 million.[1] In 1954 it cost some 29,000 Kansas farmers $7,400,000 just to haul water for domestic and livestock use. It cost us in Butler County $200,000 for such hauling. However, 800 of our neighbors just to the east in Greenwood County had a cost of $750,000 for hauling water.[2] One interesting fact is that these Greenwood County farmers paid more for water than farmers in any other Kansas county, and at that time there was an established Army Engineer Corps reservoir about centrally located within Greenwood County.

The above facts prove that the agriculture industry needs a more even distribution of water. I state this because only through greater water insoak can our aquifers be recharged to make our wells pump and streams flow. Also, through watershed districts, our farmers and ranchers can construct hundreds of medium-size lakes within a county, and these widely distributed reservoirs will constitute a dependable supply of water.

Looking still further into the possibilities of water insoak and medium-size reservoir, Representative John D. Bower (treasurer, Big Stranger Creek Watershed, and Chairman, Committee on Water Resources of Kansas House of Representatives), had this to say at the 1958 Kansas Watershed Workshop:

"One of the unexpected dividends on the Sandstone Creek watershed has been clear running water in the creek long after neighboring creeks have gone dry. We can supply water for our homes and farms, and for our neighbors in town and city."

The 68,000-acre Sandstone Creek watershed in Oklahoma, the first to be completed under SCS plans, was producing a streamflow of 2,400,000 gallons of water per day on January 5, 1956. At the junction of Sandstone Creek and Washita River there is more than 10 times as many acres in the Washita than in Sandstone Creek. How much water was the Washita producing on this day? Not a single gallon—for it's riverbed had been dry for 3 months.[3] The creek was flowing because the good stewards of the soil were able to recharge their aquifers even during the drought of 1955, while the poor stewards of the river had let their water run away. On a per-acre basis, the creek was producing more than 35 gallons per acre each day than the river. Applying these good soil practices to an area as large as Kansas, we could increase our State water production by more than 2 million acre-feet of water per year. Furthermore, this water would be more evenly distributed over a larger area than it now is.

Kansas can realize this additional water supply. This fall we had 2 to 3 inches of rain in a 48-hour period which soaked the soil. The next night we had a 4½-inch rain. The following morning, just after the rain had stopped, I went to my terraced fields. From each terrace, draining about 10 acres, a 4 x ½ inch stream was flowing. However, there had been sufficient runoff

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[1] Gilkeson, Raymond H., "Water Problem Can Be Eased," Kansas Farmer, p. 5 (Mar. 2, 1957).
[2] Mann, Dick, "What Is Water Costing You?" Kansas Farmer, p. 4 (Mar. 2, 1957).
[3] Speech by L.L. Males, banker in the Sandstone Creek watershed.

from unprotected fields to cause minor flooding on the Whitewater River, in which watershed I live. I feel safe in saying that I stored at least 1 to 2 inches more water under my ground than on unprotected slopes. If in Kansas we could, on just 25 percent of our land, increase the water insoak from rain only one-tenth of an inch per hour for only 20 hours during a year we could realize 2 million acre-feet of water. This would match the daily per-acre water production of Sandstone Creek. By conserving just a trickle of water per acre we need not worry about shortages. It is estimated the average annual water usage per person, including industrial processes, irrigated agriculture, etc., is about 1,500 tons.[4] This amount is about 1.1 acre-feet; therefore, the 2 million acre-feet of water would supply 1,800,000 more people than our present water reserve.

The second phase of the SCS plan for water storage is by construction of medium sized lakes throughout the watershed. Every person within the watershed district will be close to one of these dependable water supplies. Findings by research engineers at Kansas State University reveal that in south central Kansas it takes 20 to 30 acres of watershed drainage for each acre-foot of water storage and note that evaporation rates run as high as 4 feet per year. Due to rainfall patterns, they advise planning for storage of a 2-year water supply. Assuming that one wished to use about 10 acre-feet of water a year, we could figure on 20 acre-feet of storage for use and about 20 acre-feet of storage for evaporation and seepage. In order to maintain this 40 feet of water storage at a dependable level it would require a watershed area of 800 to 1,200 acres. Realizing the large drainage acreages required for maintaining a dependable level of water storage, it is easy to see why the small farm pond draining only 40 to 160 acres fails in dry years. Since most of the SCS detention reservoirs are designed to drain at least 1,200 acres, and usually more, they can readily be used for storing water.

Yes, the stewards of the soil hold the key to our water resources. As Representative John D. Bower stated at the 1958 watershed workshops, "We can supply water for our homes and farms, and for our neighbors on town and city. But we can hardly be expected to spend our money to store water for use by someone else, and many of our reservoir sites are not going to be developed to their full potential under present programs. Perhaps the Hope-Aiken bill should be amended to pay for water storage, or the State might make a start here under the newly approved water resources amendment."

FALL RIVER WATERSHED JOINT DISTRICT 21,
Eureka, Kans., December 8, 1959.

U.S. Senate Select Committee on National Water Resources:

My statement to the Senate Select Committee on Water Resources:

Being president of the Fall River watershed project, joint district No. 21 for the past 3 years, I have learned a lot about what it takes to get a flood-control project started. We had our first meeting in October of 1956, and have followed through all the requirements to date, and have reached the point where the soil conservation survey party will complete their survey of our project some time in December of 1959, and they will be able to submit to us their completed plan of flood control on our project some time in the early part of 1960. This will include somewhere between 30 and 40 detention dams. Our plan could possibly be submitted to Washington in the latter part of 1960, and if we receive favorable approval could get some construction started in 1961. It would take 5 to 6 years to complete these structures, as I understand that they will only approve about 20 percent of them each year. This would make this a 10-year project before we receive complete benefits.

I can see no reason why things could not be simplified so that it would not take this much time. These detention dams are only being built for the capacity to take care of flood control. We will use up the best sites for reservoirs. I contend that the dam structures should be built to full capacity of the banks where the structures are built, so that drawdown pipes could be raised in the future to retain more water, as they figure that in the next 40 years our popu-

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[4] "Water Availability—The Problem of Quantity," Monthly Review of the Federal Reserve Bank of Kansas City, p. 15 (October 1959).

lation will double, so we must have more water, and in this area all of our water must come from the retention of rainfall.

In the 13 Central States during the drought there was a serious water shortage, so that with 100-percent increase in population, what will it be in the case of another drought, which they estimate occurs in 22-year cycles?

In Eureka, Kans., there were 5 years that you could not wash your car or water your lawn. If there was a retention of 20 percent of our rainfall here, with an average of 35 inches in this locality, our watershed area could supply a city of 200,000 with adequate water for all needs, and supply water for a good bit of industry. We now use six times as much water per person as we did in 1900 and have more uses for water all the time.

Our Fall River watershed project comprises 200,000 acres, of which 87 percent is grassland and would be one of the finest water supplies. I think that the benefits of a watershed project should consist of equal benefits for the retention of water as well as flood control.

I am opposed to big dam structures that are unnecessary in most cases and cost too much money. They take too much valuable land out of projection; they take too much land from tax rolls; big lakes take several lives every year. The amended No. 566 act should include water retention and build all structures so that they could be used to full capacity in the future. I think that would make this the master plan.

The Government pays for all land taken for building big dams. Why not the Government furnish the money to buy the easement where it is not possible to obtain the same by the owner donating the site? The place to control water is near where it falls and not several miles below—after it has destroyed crops, fences, buildings, livestock, etc., in its wake.

This statement comes from a practical construction man, having spent 50 years in the construction industry, and for the past 40 years has operated a successful construction company which is still in operation, and gives employment to a large number of men in the various trades employed on numerous projects which varies up and down from time to time, and have been up most of the time for the past 20 years.

Respectfully submitted.

A. W. SODERBERG, *President.*

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